



Outboards

F100X

OWNER'S MANUAL

**READ THIS MANUAL
CAREFULLY**

U.S.A. Edition

YAMAHA MOTOR CORPORATION, U.S.A.

LIT-18626-03-50 ●



TO THE OWNER

Thank you for choosing a Yamaha outboard motor. This Owner's manual contains information needed for proper operation, maintenance and care. A thorough understanding of these simple instructions will help you obtain maximum enjoyment from your new Yamaha. If you have any question about the operation or maintenance of your outboard motor, please consult a Yamaha dealer.

In this Owner's Manual particularly important information is distinguished in the following ways.



The Safety Alert Symbol means
ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the outboard motor.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the outboard motor.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

- * Yamaha continually seeks advancements in product design and quality. Therefore, while this manual contains the most current product information available at the time of printing, there may be minor discrepancies between your machine and this manual. If there is any question concerning this manual, please consult your Yamaha dealer.

Yamaha Motor Co., Ltd.

**F100X
OWNER'S MANUAL
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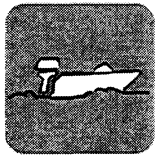
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**READ THIS OWNER'S MANUAL CAREFULLY
BEFORE OPERATING YOUR OUTBOARD MOTOR.**

EMU00004

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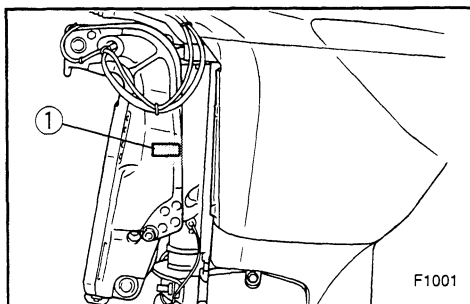
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EMU00005

IDENTIFICATION NUMBERS RECORD

EMU00007

OUTBOARD MOTOR SERIAL NUMBER



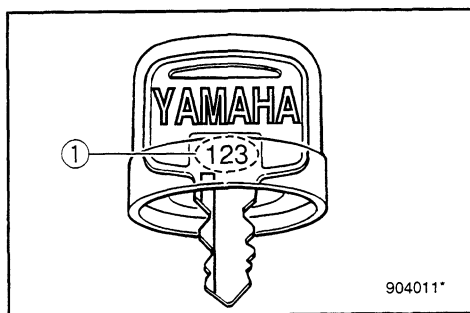
The outboard motor serial number is stamped on the label attached to the port side of the clamp-bracket. Record your outboard motor serial number in the spaces provided to assist you in ordering spare parts from your Yamaha dealer or for reference in case your outboard motor is stolen.

① Outboard motor serial number

EMU00008

KEY NUMBER

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If main key switch is equipped, your key identification number is stamped on your key as shown in the illustration. Record this number in the space provided for reference if you need a new key.

① Key number



E

EMU00947

EMISSION CONTROL INFORMATION

This engine conforms to 1999 U.S. Environment Protection Agency (EPA) regulation for marine SI engines.

Approval label of Emission control certificate

This label is attached to the bottom cowl-
ing.

① Emission control information label

EMISSION CONTROL INFORMATION		EM
ENGINE FAMILY : 4KYMXXM		
THIS ENGINE CONFORMS TO 1999 U.S. EPA REGULATIONS FOR MARINE SI ENGINES.		
FELS : <input type="text"/> g/kwhr	IDLE SPEED : <input type="text"/> rpm IN NEUTRAL	
SPARK PLUG : <input type="text"/>	SPARK PLUG GAP (mm) : <input type="text"/>	
DISPLACEMENT : <input type="text"/> cm ³	FUEL : GASOLINE	
ADVERTISED POWER : <input type="text"/> kw	VALVE LASH (mm) : IN <input type="text"/> EX <input type="text"/>	
YAMAHA MOTOR CO., LTD.		

New Technology ; (4-stroke) EM

Manufactured date label

This label is attached to the clamp bracket.

② Manufactured date label

YAMAHA	
Manufactured:	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>



EMU00917



SAFETY INFORMATION

- Before mounting or operating the outboard motor, read this entire manual. Reading it should give you an understanding of the motor and its operation.
- Before operating the boat, read any owner's or operator's manuals supplied with it and all labels. Be sure you understand each item before operating.
- Do not overpower the boat with this outboard motor. Overpowering the boat could result in loss of control. The rated power of the outboard should be equal to or less than the rated horsepower capacity of the boat. If the rated horsepower capacity of the boat is unknown, consult the dealer or boat manufacturer.
- Do not modify the outboard. Modifications could make the motor unfit or unsafe to use.
- Never operate after drinking alcohol or taking drugs. About 50% of all boating fatalities involve intoxication.
- Have an approved personal flotation device (PFD) on board for every occupant. It is a good idea to wear a PFD whenever boating. At a minimum, children and non-swimmers should always wear PFDs, and everyone should wear PFDs when there are potentially hazardous boating conditions.
- Gasoline is highly flammable, and its vapors are flammable and explosive. Handle and store gasoline carefully. Make sure there are no gas fumes or leaking fuel before starting the engine.
- This product emits exhaust gases which contain carbon monoxide, a colorless, odorless gas which may cause brain damage or death when inhaled. Symptoms include nausea, dizziness, and drowsiness. Keep cockpit and cabin areas well ventilated. Avoid blocking exhaust outlets.
- Check throttle, shift, and steering for proper operation before starting the engine.
- Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg while operating. If you accidentally leave the helm, the lanyard will pull from the switch, stopping the engine.
- Know the marine laws and regulations where you will be boating - and obey them. Refer to "RULES OF THE ROAD" section for basic boating rules.
- Stay informed about the weather. Check weather forecasts before boating. Avoid boating in hazardous weather.
- Tell someone where you are going: leave a Float Plan with a responsible person. Be sure to cancel the Float Plan when you return.
- Use common sense and good judgment when boating. Know your abilities, and be sure you understand how your boat handles under the different boating conditions you may encounter. Operate within your limits, and the limits of your boat. Always operate at safe speeds, and keep a careful watch for obstacles and other traffic.
- Always watch carefully for swimmers during the engine operation.
- Stay away from swimming areas.



- When a swimmer is in the water near you shift into neutral and shut off the engine.
- Be informed about boating safety. Additional publications and information can be obtained from many organizations, including the following:

United States Coast Guard

Consumer Affairs Staff (G-BC)
Office of Boating, Public, and Consumer
Affairs
U.S. Coast Guard Headquarters
Washington, D.C. 20593-0001
Boating Safety Hotline: 1-800-368-5647

National Marine Manufacturers Association (NMMA)

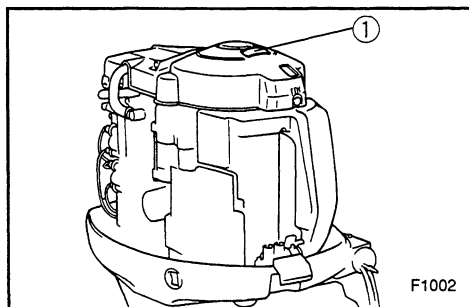
401 N. Michigan Ave.
Chicago, IL 60611

Marine Retailers Association of America

155 N. Michigan Ave.
Chicago, IL 60601



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EMU00014*

IMPORTANT LABELS

WARNING LABELS

①



WARNING

- Be sure shift control is in neutral before starting engine. (except 2HP)
- Do not touch or remove electrical parts when starting or during operation.
- Keep hands, hair, and clothes away from flywheel and other rotating parts while engine is running.

YAMAHA

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BASIC BOATING RULES (Rules of the road)

Just as there are rules which apply when you are driving on streets and high ways, there are waterway rules which apply when you are driving your boat. These rules are used internationally, and are also enforced by the United States Coast Guard and local agencies. You should be aware of these rules, and follow them whenever you encounter another vessel on the water.

Several sets of rules prevail according to geographic location, but are all basically the same as the International Rules of the Road. The rules presented here in your Owner's Manual are condensed, and have been provided for your convenience only. Consult your local U.S. Coast Guard Auxiliary or Department of Motor Vehicles for a complete set of rules governing the waters in which you will be using your boat.

STEERING AND SAILING RULES AND SOUND SIGNALS

Whenever two vessels on the water meet one another, one vessel has the right-of-way; it is called the "stand-on" vessel. The vessel which does not have the right-of-way is called the "give-way" or "burdened" vessel. These rules determine which vessel has the right-of-way, and what each vessel should do.

Stand-on vessel

The vessel with the right-of-way has the duty to continue its course and speed, except to avoid an immediate collision. When you maintain your direction and speed, the other vessel will be able to determine how best to avoid you.

Give-way vessel

The vessel which does not have the right-of-way has the duty to take positive and timely action to stay out of the way of the Stand-On vessel. Normally, you should not cross in front of the vessel with the right-of-way. You should slow down or change directions briefly and pass behind the other vessel. You should always move in such a way that the operator of the other vessel can see what you are doing.

"The general prudential rule"

This rule is called Rule 2 in the International Rules and says,

'In obeying and construing these rules due regard shall be had to all dangers of navigation and collision, and to any special circumstances, which may render a departure from the above rules necessary in order to avoid immediate danger.'

In other words, follow the standard rules except when a collision will occur unless both vessels try to avoid each other. If that is the case, both vessels become "Give-Way" vessels.



RULES WHEN ENCOUNTERING VESSELS

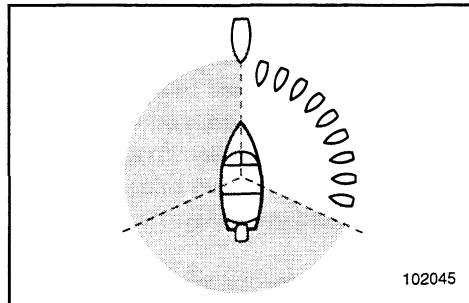
There are three main situations which you may encounter with other vessels which could lead to a collision unless the Steering Rules are followed:

Meeting (you are approaching another vessel head-on)

Crossing (you are traveling across the other vessel's path)

Overtaking (you are passing or being passed by another vessel)

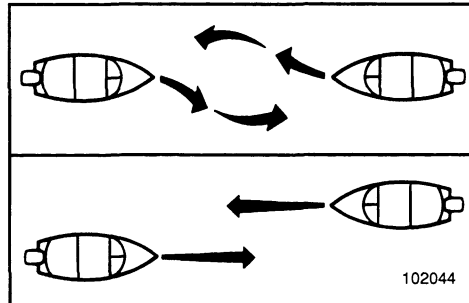
In the following illustration, your boat is in the center. You should give the right-of-way to any vessels shown in white area (you are the Give-Way vessel). Any vessels in the shaded area must yield to you (they are the Give-Way vessels). Both you and the meeting vessel must alter course to avoid each other.



Meeting

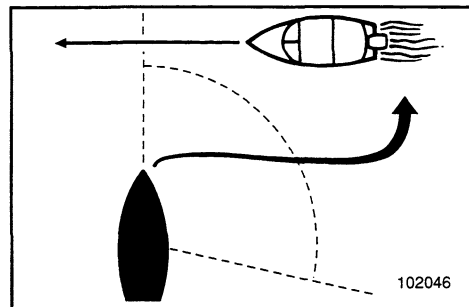
If you are meeting another power vessel head on, and are close enough to run the risk of collision, neither of you has the right-of-way! Both of you should alter course to avoid an accident. You should keep the other vessel on your port (left) side. This rule doesn't apply if both of you

will clear one another if you continue on your set course and speed.



Crossing

When two power driven vessels are crossing each other's path close enough to run the risk of collision, the vessel which has the other on the starboard (right) side must keep out of the way of the other. If the other vessel is on your right, you must keep out of its way; you are the Give-Way vessel. If the other vessel is on your port (left) side, remember that you should maintain course and direction, provided the other vessel gives you the right-of-way as it should.



Overtaking

If you are passing another vessel, you are the "Give-Way" vessel. This means that the other vessel is expected to maintain



its course and speed. You must stay out of its way until you are clear of it. Likewise, if another vessel is passing you, you should maintain your speed and direction so that the other vessel can steer itself around you.

OTHER SPECIAL SITUATIONS

There are three other rules you should be aware of when driving your boat around other vessels.

Narrow channels and bends

When navigating in narrow channels, you should keep to the right when it is safe and practical to do so. If the operator of a power-driven vessel is preparing to go around a bend that may obstruct the view of other water vessels, the operator should sound a prolonged blast on the whistle (4 to 6 seconds). If another vessel is around the bend, it too should sound the whistle. Even if no reply is heard, however, the vessel should still proceed around the bend with caution. If you navigate such waters with your boat, you will need to carry a portable air horn, available from local marine supply stores.

Fishing vessel right-of-way

All vessels which are fishing with nets, lines or trawls are considered to be "fishing vessels" under the International Rules. Vessels with trolling lines are not considered fishing vessels. Fishing vessels have the right-of-way regardless of position. Fishing vessels cannot, however, impede the passage of other vessels in narrow channels.

Sailing vessel right-of-way

Sailing vessels should normally be given the right-of-way. The exceptions to this are:

1. When the sailing vessel is overtaking the power-driven vessel, the power-driven vessel has the right-of-way.
2. Sailing vessels should keep clear of any fishing vessel.
3. In a narrow channel, a sailing vessel should not hamper the safe passage of a power-driven vessel which can navigate only in such a channel.

Reading buoys and other markers

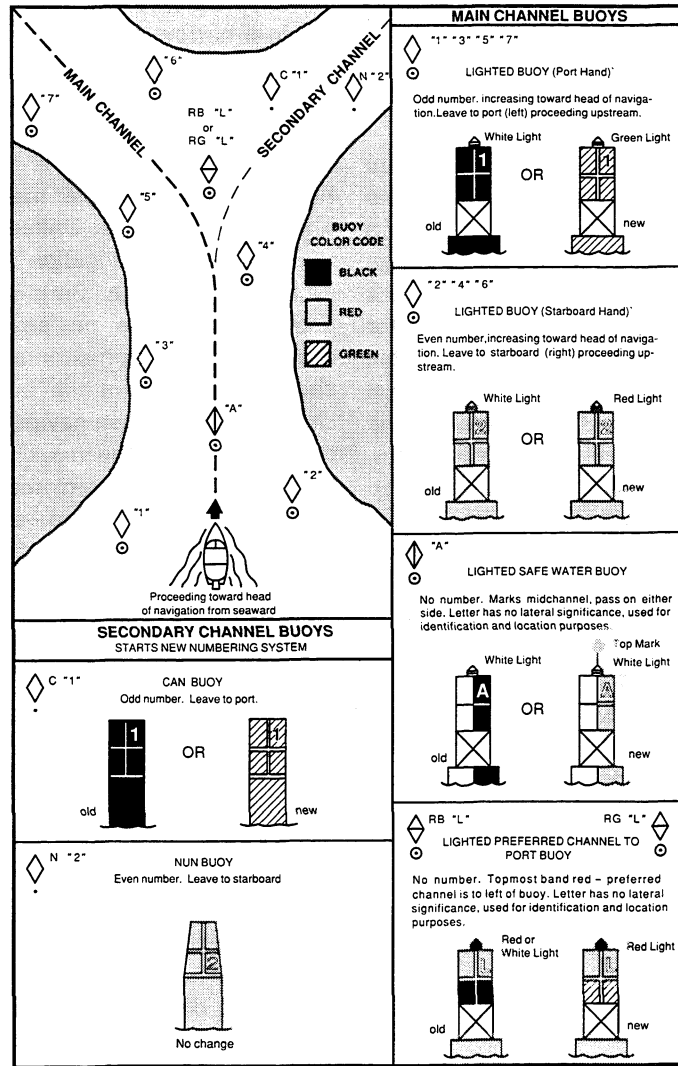
The waters of the United States are marked for safe navigation by the lateral system of buoyage. Simply put, buoys and markers have an arrangement of shapes, colors, numbers and lights to show which side of the buoy a boater should pass on when navigating in a particular direction. The markings on these buoys are oriented from the perspective of being entered from seaward (the boater is going towards the port). This means that red buoys are passed on the starboard (right) side when proceeding from open water into port, and black buoys are to port (left) side. When navigating out of port, your position with respect to the buoys should be reversed; red buoys should be to port and black buoys to starboard.

Many bodies of water used by boaters are entirely within the boundaries of a particular state. The Uniform State Waterway Marking System has been devised for these waters. This system uses buoys and signs with distinctive shapes and colors to show regulatory or advisory informa-



tion. These markers are white with black letters and orange borders. They signify speed zones, restricted areas, danger areas, and general information.

Remember, markings may vary by geographic location. Always consult local boating authorities before driving your boat in unfamiliar waters.



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EMU00016

FUELING INSTRUCTIONS

⚠ WARNING

GASOLINE AND ITS VAPORS ARE HIGHLY FLAMMABLE AND EXPLOSIVE!

- Do not smoke when refueling, and keep away from sparks, flames, or other sources of ignition.
- Stop engine before refueling.
- Refuel in a well-ventilated area. Refuel portable fuel tanks off the boat.
- Take care not to spill gasoline. If gasoline spills, wipe it up immediately with dry rags.
- Do not overfill the fuel tank.
- Tighten the filler cap securely after refueling.
- If you should swallow some gasoline inhale a lot of gasoline vapor, or get gasoline in your eyes, get immediate medical attention.
- If any gasoline spills onto your skin, immediately wash with soap and water. Change clothing if gasoline spills on it.
- Touch the fuel nozzle to the filler opening or funnel to help prevent electrostatic sparks.

CAUTION:

Use only new clean gasoline which has been stored in clean containers and is not contaminated with water or foreign matter.



EMU00025

GASOLINE (PETROL)

Recommended gasoline:
Regular unleaded gasoline with a
minimum octane rating of 86 (Pump
Octane Number) = $(R+M)/2$

If knocking or pinging occurs, use a different brand of gasoline or premium unleaded fuel. If unleaded gasoline is not available, then leaded regular gasoline can be used.

If leaded gasoline is usually used, engine valves and related parts should be inspected after every 300 hours of operation.

EMU00027

Gasohol

There are two types of gasohol: gasohol containing ethanol and that containing methanol. Gasohol containing ethanol can be used if ethanol content does not exceed 10% and the fuel meets minimum octane ratings. Gasohol containing methanol is not recommended by Yamaha because it can cause fuel system damage or engine performance problems.



EMU00878

ENGINE OIL

Recommended engine oil;
4 stroke motor oil with a combination of
corresponding SAE and API shown
below;

SAE	API
10W-30	SE
10W-40	SF
	SG
	SH

Engine oil quantity:
Refer to SPECIFICATIONS on Page 4-1.

NOTE: _____
If the recommended engine oil is not
available, then a multigrade type engine
oil such as SF-CC/CD,SG-CC/CD or SH-CD
can be used.



EMU00031

BATTERY REQUIREMENT

CAUTION:

Do not use the battery that does not meet the specified capacity. If different battery from the specification is used, the electric system may perform poorly or be overloaded, causing electrical system damage.

Choose battery which meets the following specifications for Electric start model.

Minimum cold crank performance 380 Amps at -17.8°C (0°F) Minimum reserve capacity 124 minutes at 26.7°C (80°F)

EMU00035

PROPELLER SELECTION

The performance of your outboard motor will be critically affected by your choice of propeller, for an incorrect one could adversely affect performance and could seriously damage the motor. The engine speed depends on the propeller size and the boat load. If the engine speed is too high or too low for good engine performance, this will have an adverse effect on the engine.



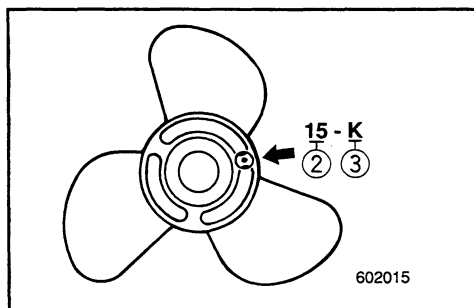
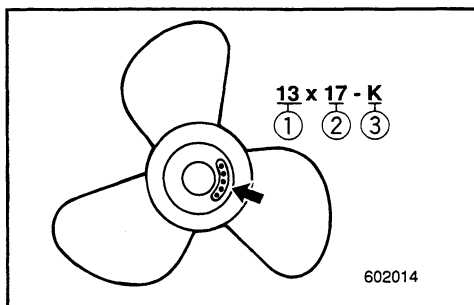
Yamaha outboard motors are fitted with propellers chosen to perform well over a range of applications, but there may be uses where a propeller with a different pitch would be better. For a greater operating load, a smaller-pitch propeller is more suitable as it enables the correct engine speed to be maintained. Conversely, a larger-pitch propeller is more suitable for a smaller operating load.

Yamaha dealers stock a range of propellers, and can advise you and install a propeller on your outboard that is best suited to your application.

NOTE:

Select a propeller which will allow the engine to reach the middle or upper half of the operating range at full throttle with the maximum boat load. If operating conditions such as light boat loads then allow the engine rpm to rise above the maximum recommended range, reduce the throttle setting to maintain the engine in the proper operating range.

Recommended full throttle operating range;
Refer to SPECIFICATIONS, Page 4-1.



- ① Propeller diameter (in inches)
- ② Propeller pitch (in inches)
- ③ Type of propeller (Propeller mark)

Propeller removal and installation; Refer to propeller checking section in Chapter 4.

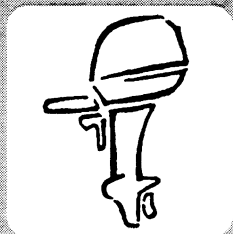


EMU00901

START-IN-GEAR PROTECTION

Yamaha outboard motor has the start-in-gear protection device(s). This feature permits the engine to be started only when it is Neutral. Always select Neutral before starting the engine.

EMU00037



Chapter 2

BASIC COMPONENTS

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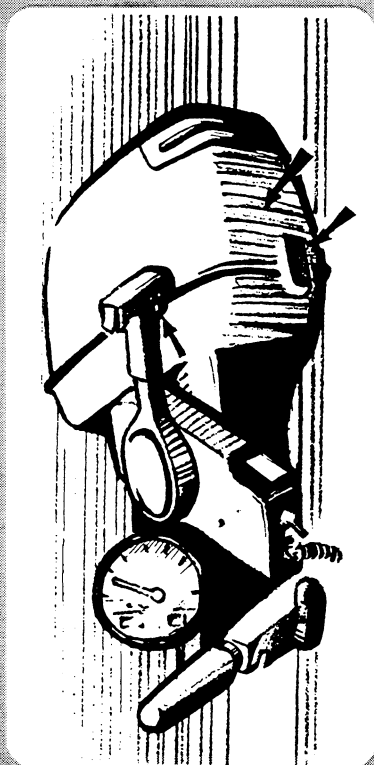
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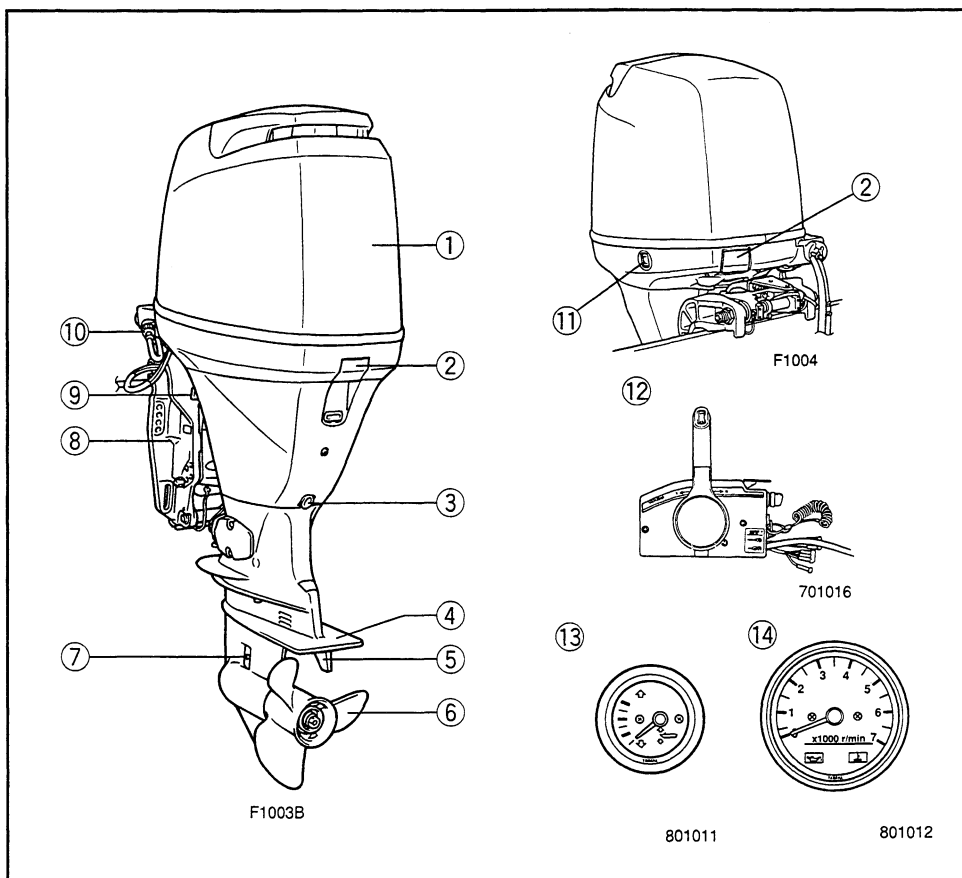
2



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EMU00038

MAIN COMPONENTS



- ① Top cowling
- ② Cowling lock lever
- ③ Oil drain bolt
- ④ Anti-cavitation plate
- ⑤ Trim tab (Anode)
- ⑥ Propeller
- ⑦ Cooling water inlet
- ⑧ Clamp bracket

- ⑨ Tilt support lever
- ⑩ Flushing device
- ⑪ Power trim and tilt switch
- * ⑫ Remote control box
- * ⑬ Trim meter
- * ⑭ Tachometer

*It differs on specifications.



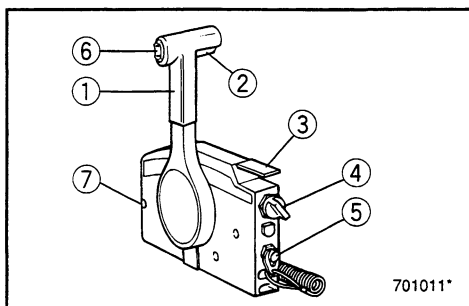
EMU00039

OPERATIONS OF CONTROLS AND OTHER FUNCTIONS

EMU00096

REMOTE CONTROL

Both the shifter and the throttle are actuated by the remote control lever. In addition, this control also has the electrical switches.

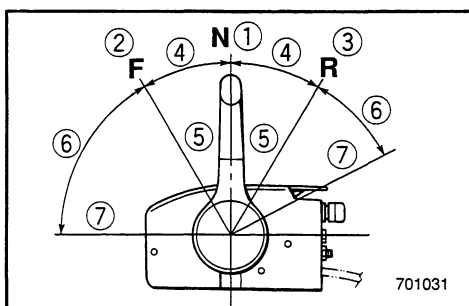


- ① Remote control lever
- ② Neutral interlock trigger
- ③ Neutral throttle lever
- ④ Main switch
- ⑤ Engine stop lanyard switch
- ⑥ Power trim/tilt switch
- ⑦ Throttle friction adjusting screw

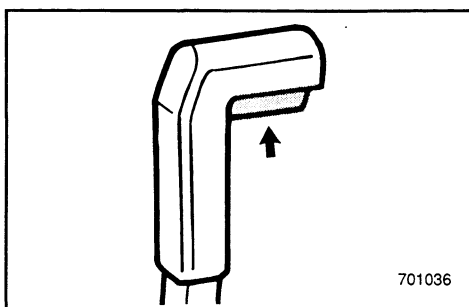
EMU00098

Remote Control Lever

Moving the lever forward from the Neutral position engages Forward gear. Pulling the lever back from Neutral engages Reverse. The engine will continue to run at idle until the lever is moved about 35° (a detent can be felt). Moving the lever farther opens the throttle, and the engine will begin to accelerate.



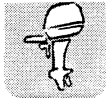
- ① Neutral
- ② Forward
- ③ Reverse
- ④ Shift
- ⑤ Fully closed
- ⑥ Throttle
- ⑦ Fully open



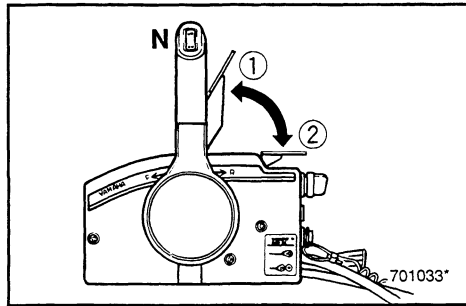
EMU00099

Neutral Interlock Trigger

To shift out of Neutral, the neutral interlock trigger of the remote control lever must first be pulled up.



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EMU00100

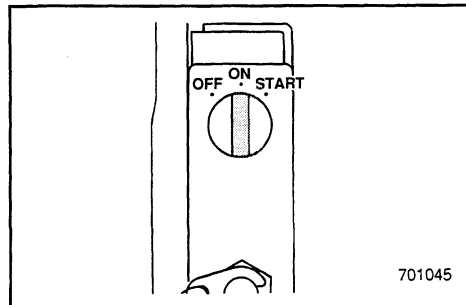
Neutral Throttle Lever

To open the throttle without shifting into either Forward or Reverse, place the remote control lever in the Neutral position and lift the neutral throttle lever.

NOTE:

The neutral throttle lever will operate only when the remote control lever is in Neutral. The remote control lever will operate only when the neutral throttle lever is in the closed position.

- ① Fully open
- ② Fully closed



EMU00101

Main switch

The main switch controls the ignition system; its operation is described below.

• OFF

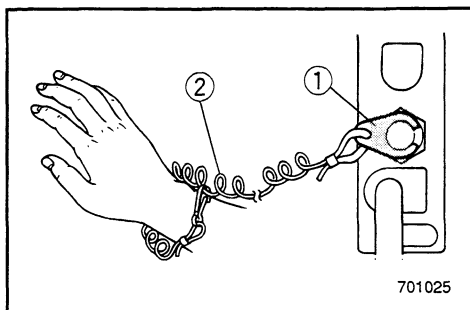
Electrical circuits switched off.
(The key can be removed.)

• ON

Electrical circuits switched on.
(The key cannot be removed.)

• START

Starter-motor will turn and start engine.
(When the key is released, it returns automatically to "ON".)



EMU00934

Engine Stop Lanyard Switch

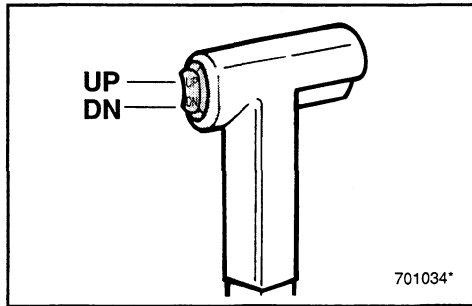
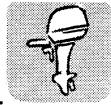
The lock-plate ① must be attached to the engine stop lanyard switch for the engine to run. The lanyard ② should be attached to a secure place on the operator's clothing, or arm or leg. Should the operator fall overboard or leave the helm, the lanyard will pull out the lock plate, stopping ignition to the engine. This will prevent the boat from running away under power.

⚠ WARNING

- Attach the lanyard to a secure place on your clothing, your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the lanyard in such a way that it could become entangled, preventing it from functioning.
- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.

NOTE:

The engine cannot be started with the lock-plate removed.



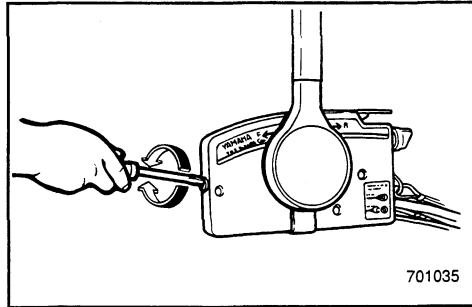
EMU00104

Power Trim/Tilt Switch

The power trim/tilt adjusts the motor angle in relation to the transom. The power trim/tilt switch is located on the remote control lever grip. Pushing the switch UP trims the motor up, then tilts the motor up. Pressing the switch DN tilts the motor down and trims the motor down. When the switch button is released, the motor will stop in its current position.

⚠WARNING

Excessive trim for the operating conditions (either trim up or down) can cause boat instability and can make steering the boat more difficult. This increases the possibility of an accident. If the boat begins to feel unstable or is hard to steer, slow down and/or readjust the trim angle.



EMU00107

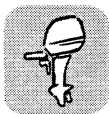
Throttle Friction Adjusting Screw

A friction device in the remote control box provides resistance to movement of the remote control lever. This is adjustable for operator preference. An adjusting screw is located at the front of the remote control box.

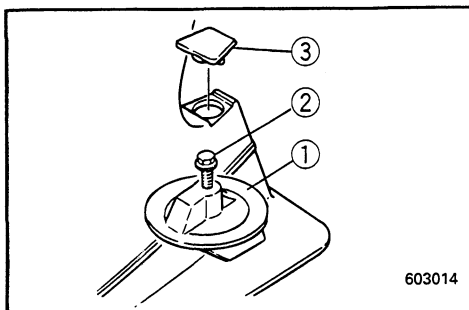
Resistance	Screw
Increase	Turn to clockwise
Decrease	Turn to counterclockwise

⚠WARNING

Do not overtighten the friction adjusting screw. If there is too much resistance, it may be difficult to move the lever, which could result in an accident.



E



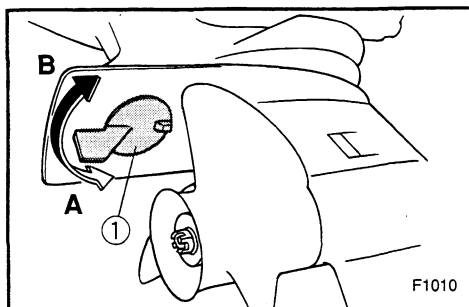
EMU00113

TRIM TAB

The trim tab should be adjusted so that the steering control can be turned to either the right or left by applying the same amount of force.

⚠ WARNING

An improperly adjusted trim tab may cause difficult steering. Always test run after the trim tab has been installed or replaced to be sure steering is correct. Be sure you have tightened the bolt after adjusting the trim tab.

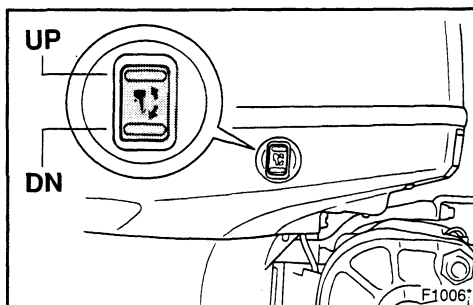


- ① Trim tab
- ② Bolt
- ③ Cap (if equipped)

Boat tends to veer	The fin of trim tab
To the left (port side)	Turn to the left (A in the figure)
To the right (starboard side)	Turn to the right (B in the figure)

CAUTION:

The trim tab also serves as an anode to protect the engine from electrochemical corrosion. Never paint the trim tab as it will become ineffective as an anode.

**E**

EMU00119

POWER TRIM/TILT SWITCH

The power trim/tilt adjusts the motor angle in relation to the transom. The power trim/tilt switch is located on the port side of the bottom engine cowling. Pushing the switch "UP" trims the motor up, then tilts the motor up. Pressing the switch "DN" tilts the motor down and trims the motor down. When the switch button is released, the motor will stop in its current position.

⚠ WARNING

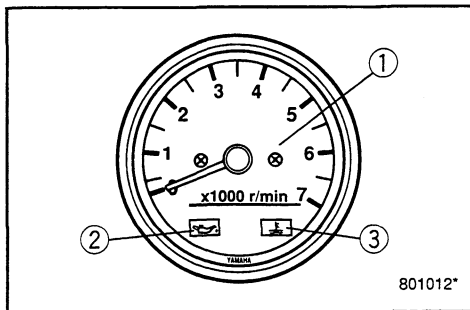
Excessive trim for the operating conditions (either trim up or down) can cause boat instability and can make steering the boat more difficult. This increases the possibility of an accident. If the boat begins to feel unstable or is hard to steer, slow down and/or readjust the trim angle.

NOTE:

Another power trim/tilt switch is provided with this model for remote installation. This switch has the same function as the switch equipped on the engine.



E



EMU00125

TACHOMETER

This meter contains the following functions,

- ① Tachometer
- ② Low oil pressure warning lamp
- ③ Overheat warning lamp

EMU00126

Tachometer

This meter shows the engine speed.

EMU00127

Low Oil Pressure Warning Lamp

If oil pressure drops too low, this lamp will flash.

EMU00130

Overheat Warning Lamp

If the engine temperature rises too high, this lamp will flash.

CAUTION:

Do not continue to run the engine if the low oil pressure lamp or the overheat warning lamp is "ON". Serious engine damage may occur.

NOTE:

When the main switch is first turned on, all warning lamps flash for a few seconds. If a light does not flash, replace the bulb.

EMU00132

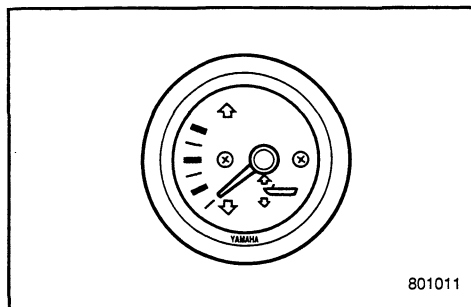
TRIM METER

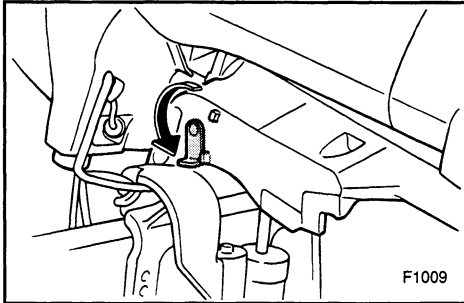
(for Power trim/tilt model)

This meter shows the trim angle of your outboard.

NOTE:

Memorize the trim angles that work best for your boat under different conditions. Adjust the trim angle to the desired setting by operating the power trim/tilt switch.

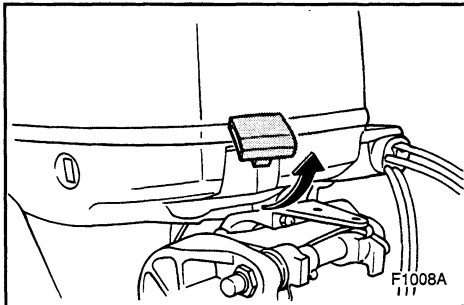




EMU00157

TILT SUPPORT LEVER

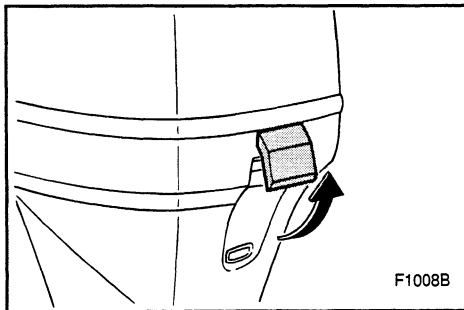
To keep the outboard motor in the tilted-up position, lock the tilt support lever to the clamp bracket.

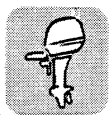


EMU00163

TOP COWLING LOCK LEVERS

To remove the engine top cowling, pull up the front and rear lock levers. Then lift off the cowling. When replacing the cowling, check to be sure it fits properly in the rubber seal. Then lock the cowling again by moving the levers downward.





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EMU00169*

WARNING SYSTEM

CAUTION:

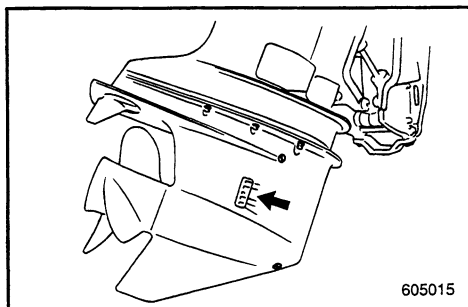
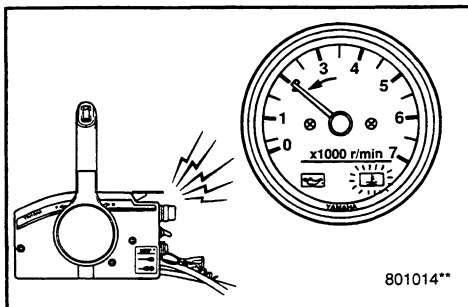
Do not continue to operate the engine if the warning device has activated. Consult your Yamaha dealer if the problem cannot be located and corrected.

EMU00170*

OVERHEAT WARNING

This engine has an overheat warning device. If the engine temperature rises too high, the warning device will activate.

(○); Included (—); N/A

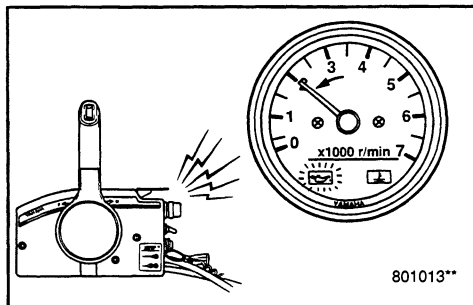


Activation of warning device	Tiller control model	Remote control model
The engine speed will automatically decrease to about 3,000 r/min.	—	○
The overheat warning indicator will come on.	—	○
The buzzer will sound.	—	○

If the warning system has been activated, stop the engine and check the water inlet for clogging.



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EMU00173*

LOW OIL PRESSURE WARNING

If oil pressure drops too low, the warning device will activate.

(○):Included (—):N/A

Activation of warning device	Tiller control model	Remote control model
Engine speed will automatically decrease to about 3,000 r/min.	/	○
The low oil pressure warning indicator will come on.	/	○
The buzzer will sound.	/	○

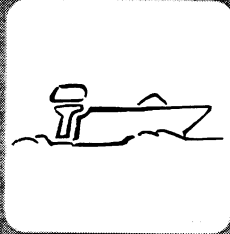
If the warning system has been activated, stop the engine as soon as it is safe to do so. Check oil level and add oil as needed. If the oil level is correct, consult your Yamaha dealer.

CAUTION:

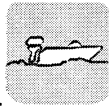
Do not continue to run the engine if the low oil pressure lamp is "ON". Serious engine damage may occur.

EMU00174

Chapter 3 OPERATION



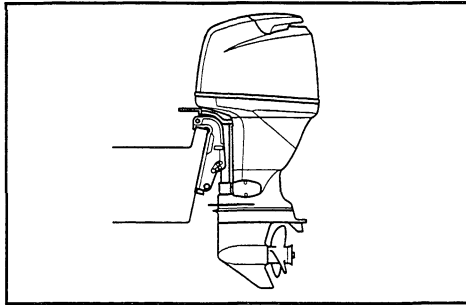
INSTALLATION	3-1
Mounting the outboard motor	3-2
Filling fuel.....	3-4
PRE-OPERATION CHECKS	3-5
Checking the engine oil level	3-6
BREAKING IN (RUNNING IN) ENGINE...	3-7
STARTING ENGINE	3-8
WARMING UP ENGINE	3-11
SHIFTING	3-12
Forward	3-12
Reverse.....	3-12
STOPPING ENGINE	3-13
TRIMMING OUTBOARD MOTOR.....	3-14
TILTING UP/DOWN	3-17
CRUISING IN OTHER CONDITIONS.....	3-19
Cruising in salt water	3-19



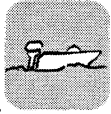
INSTALLATION

CAUTION:

Incorrect engine height or obstructions to smooth water flow (such as the design or condition of the boat or accessories such as transom ladders/depth finder transducers) can create airborne water spray while the boat is cruising. Severe engine damage may result if the motor is operated continuously in the presence of airborne water spray.

**NOTE:**

During water testing check the buoyancy of the boat, at rest, with its maximum load. Check that the static water level on the exhaust housing is low enough to prevent water entry into the powerhead, when water rises due to waves when the outboard is not running.



EMU00176

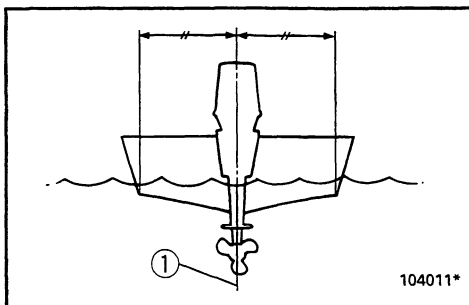
MOUNTING THE OUTBOARD MOTOR

⚠WARNING

Improper mounting of the outboard motor could result in hazardous conditions such as poor handling, loss of control, or fire hazards. Observe the following:

- The information presented in this section is intended as reference only. It is not possible to provide complete instructions for every possible boat/motor combination. Proper mounting depends in part on experience and the specific boat/motor combination.
- Your dealer or other person experienced in proper rigging should mount the motor. If you are mounting the motor yourself, you should be trained by an experienced person. [permanent mounted type]
- Your dealer or other person experienced in proper outboard motor mounting should show you how to mount your motor. [portable type]

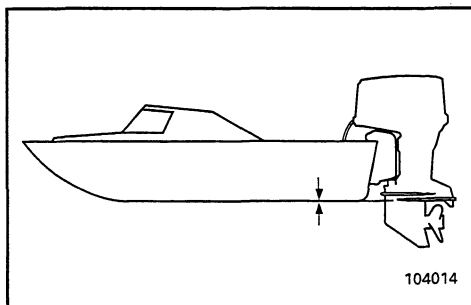
Mount the outboard motor on the center line (keel line) of the boat, and ensure that the boat itself is well balanced. Otherwise, the boat will be hard to steer. For boats without a keel or which are asymmetrical, consult your dealer.



- ① Center line (keel line)

**⚠ WARNING**

Overpowering a boat may cause severe instability. Do not install an outboard motor with more horsepower than the maximum rating on the capacity plate of the boat. If the boat does not have a capacity plate, consult the boat manufacturer.



EMU00179

Mounting Height

To run your boat at optimum efficiency, the water-resistance (drag) of the boat and outboard motor must be made as little as possible. The mounting-height of the outboard motor greatly affects the water-resistance. If the mounting-height is too high, cavitation tends to occur, thus reducing the propulsion; and if the propeller tips cut the air, the engine speed will rise abnormally and cause the engine to overheat. If the mounting-height is too low, the water-resistance will increase and thereby reduce engine efficiency. Mount the engine so that the anti-cavitation plate is in alignment with the bottom of the boat.

NOTE:

The optimum mounting height of the outboard motor is affected by the boat/motor combination. Test runs at different heights can help determine the optimum mounting height.



EMU00187*

FILLING FUEL

- 1) Remove the fuel tank cap.
- 2) Fill the fuel tank carefully.
- 3) Close the cap securely after refueling.
Wipe up any spilled fuel.

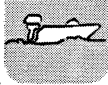
EMU00189*

Ring Free Fuel Additive

Gasoline is a precise blend of many different substances, each chosen to give certain characteristics. Gasoline blends have been changing in recent years in response to concerns about pollution and resulting emissions regulations. One of the most obvious changes has been the elimination of lead from most fuels.

As gasoline has changed, the amount of additives such as aromatics and oxygenates has increased. These additives are important for the engines in passenger cars, but they can have detrimental effects in marine engines, because of increased deposits in the combustion chamber. When enough deposits collect, piston rings begin sticking. Performance drops and engine wear increases dramatically.

While many additives available may reduce deposits, Yamaha recommends the use of **Ring Free Fuel Additive**, available from your Yamaha dealer. Ring Free has repeatedly proven its ability to clean combustion deposits from inside the engine, notably the critical piston-ring-land area, and fuel system components. Follow product labeling for use instructions.



EMU00204

PRE-OPERATION CHECKS

⚠ WARNING

If any item in the pre-operation check is not working properly, have it inspected and repaired before operating the out-board motor. Otherwise, an accident could occur.

CAUTION:

Do not start the engine out of water. Overheating and serious engine damage can occur.

EMU00206

Fuel

- Check to be sure you have plenty of fuel for your trip.
- Make sure there are no fuel leaks or gasoline fumes.
- Check fuel line connections to be sure they are tight.
- Be sure the fuel tank is positioned on a secure, flat surface, and that the fuel hose is not twisted or flattened, or likely to contact sharp objects.

EMU00208

Oil

- Check the level of the oil in the sump with the dipstick. If necessary, add oil to bring the level up to the upper mark.



EMU00209

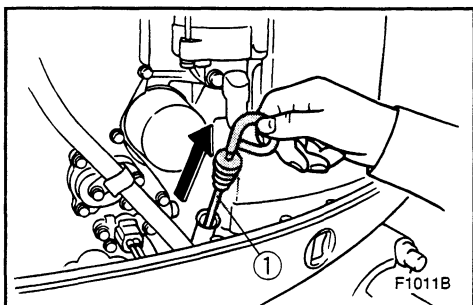
Controls

- Check throttle, shift, and steering for proper operation before starting the engine.
- The controls should work smoothly, without binding or unusual free play.
- Look for loose or damaged connections.
- Check operation of the starter and stop switches when the outboard motor is in the water.

EMU00210

Engine

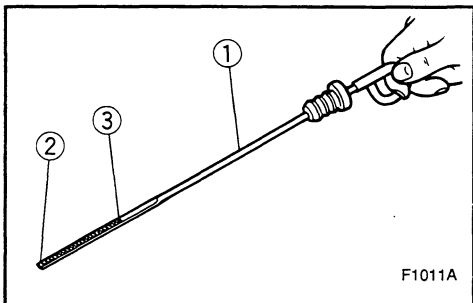
- Check the engine and engine mounting.
- Look for loose or damaged fasteners.
- Check the propeller for damage.



EMU00212

CHECKING THE ENGINE OIL LEVEL

- 1) Put the outboard motor in vertical position.
- 2) Pull out the oil dipstick and wipe off engine oil on it.
- 3) Insert the dipstick completely and pull out it again.
- 4) Check the oil level on the dipstick. If the oil level is not between upper and lower level, add oil as necessary. (Refer to "CHANGING ENGINE OIL" section.)



- ① Oil dipstick
- ② Lower level mark
- ③ Upper level mark



EMU00224

BREAKING IN (RUNNING IN) ENGINE

Your new engine requires a period of break-in (running-in) to allow mating surfaces of moving parts to wear-in evenly. Correct break-in (running-in) will help ensure proper performance and longer engine life.

CAUTION:

Failure to follow the break-in (running-in) procedure may result in reduced engine life or even severe engine damage.

Break-in (running-in) time: 10 hours

EMU00233

Run the engine under load (in gear with a propeller installed) as follows.

- 1) For the first hour of operation:
Run the engine at 2,000 r/min or at approximately half throttle.
- 2) For the second hour of operation:
Run the engine at 3,000 r/min or at approximately three-quarter throttle, and during this period run it at full throttle for approximately one minute every ten minutes.
- 3) For the next eight hours of operation:
Avoid continuous operation at full throttle for more than five minutes at a time.
- 4) After these first 10 hours:
Operate the engine normally.



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EMU00919

STARTING ENGINE

⚠ WARNING

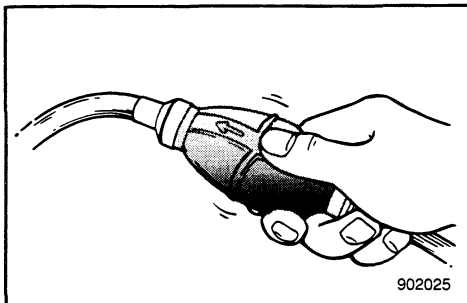
- Before starting the engine, make sure that the boat is tightly moored and that you can steer clear of any obstructions. Be sure there are no swimmers in the water near you.
- When the air-vent screw is loosened, gasoline(petrol) vapor will be released. Gasoline(petrol) is highly flammable, and its vapors are flammable and explosive. Refrain from smoking, and keep away from open flames and sparks while loosening the air-vent screw.
- This product emits exhaust gases which contain carbon monoxide, a colorless, odorless gas which may cause brain damage or death when inhaled. Symptoms include nausea, dizziness, and drowsiness. Keep cockpit and cabin areas well ventilated. Avoid blocking exhaust outlets.

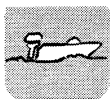
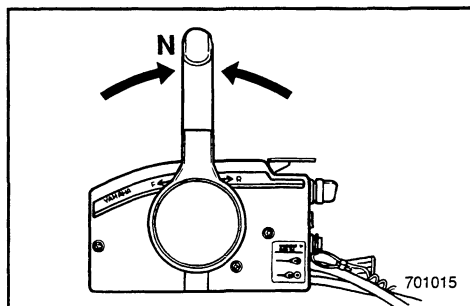
- 1) If the air vent screw is provided on the fuel tank cap, loosen it 2 or 3 turns.
- 2) If the fuel joints provided on the motor, firmly connect the fuel joint to the motor. Firmly connect the other joint to the fuel tank.

NOTE:

During engine operation place the tank horizontally, or fuel could not be sucked.

- 3) Squeeze the primer bulb with the outlet end up until you feel it become firm.



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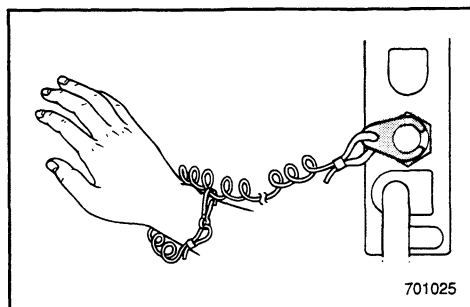
EMU00247*

PROCEDURE FOR REMOTE CONTROL MODEL

- 4) Place the remote control lever in the Neutral position.

NOTE:

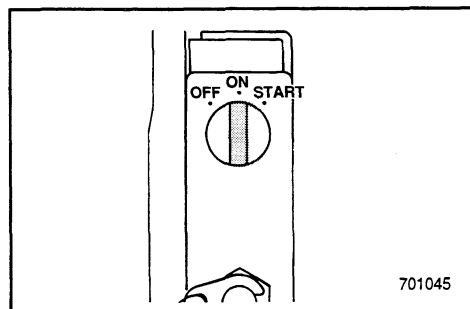
The start-in-gear protection device prevents the engine from starting except when in Neutral.



- 5) Attach the engine stop switch lanyard to a secure place on your clothing, or your arm or leg. Then, install the lock plate on the other end of the lanyard in the engine stop switch.

WARNING

- Attach the engine stop switch lanyard to a secure place on your clothing, your arm or leg while operating.
- Do not attach the lanyard to clothing that could tear loose. Do not route the lanyard where it could become entangled, preventing from functioning.
- Avoid accidentally pulling the lanyard during normal operation. Loss of engine power means the loss of most steering control. Also, without engine power, the boat could slow rapidly. This could cause people and objects in the boat to be thrown forward.



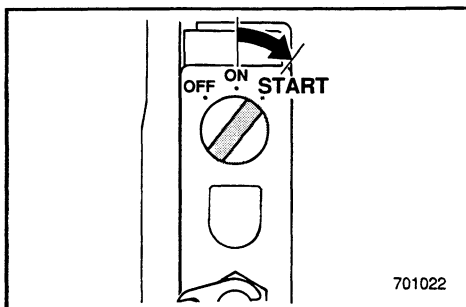
- 6) Turn the main switch to "ON".

NOTE:

When the main switch is first turned on, all warning lamps flash for a few seconds. If a light does not flash, replace the bulb.



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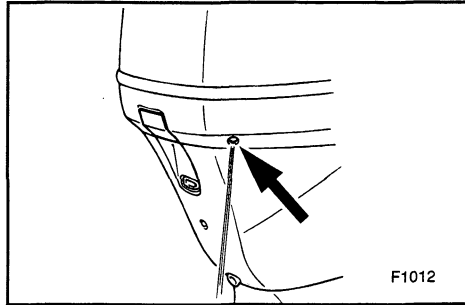
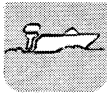
EMU00949

Electric Start Model

- 7) Turn the main switch to "START", and hold it for a maximum of 5 seconds.
- 8) Immediately after the engine starts, release the main switch to return it to "ON".

CAUTION:

- Do not turn the main switch to "START" when the engine is running.
- Do not keep the starter-motor turning for more than 5 seconds. The battery will rapidly become exhausted and it will be impossible for it to start the engine. If the engine does not start within 5 seconds, return the main switch to "ON", wait 10 seconds, and then crank the engine again.



EMU00258*

WARMING UP ENGINE

- 1) Before beginning operation, allow the engine to warm up at idling speed for 3 minutes. (Failure to do this will shorten engine life.)
- 2) Be sure the low oil pressure warning indicator goes off after starting the engine.
- 3) Check for a steady flow of water from the cooling-water pilot hole.

CAUTION:

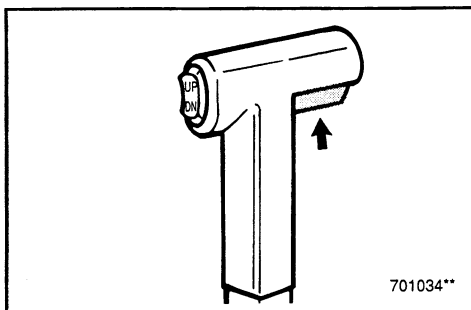
- If the low oil pressure indicator does not go off after the engine starts, stop the engine. Otherwise, serious engine damage could occur. Check the oil level and add oil if necessary. If the cause for the low oil pressure warning indicator cannot be found, consult your Yamaha dealer.
- A continuous flow of water from the pilot hole shows that the water pump is pumping water through the cooling passages. If water is not flowing out of the pilot hole at all times while the engine is running, do not continue to run the engine. Overheating and serious damage could occur. Stop the engine and check to see if the water inlet on the lower casing is blocked. If the problem cannot be found and corrected, consult your Yamaha dealer.

NOTE:

After the engine starts, warm-up operation is automatically controlled by Electronic Fuel Injection system. Automatic control is canceled if the throttle is opened more than halfway.



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EMU00261

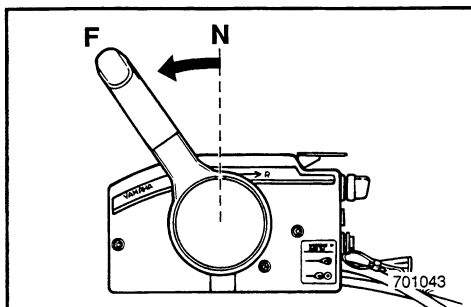
SHIFTING

⚠ WARNING

Before shifting, make sure there are no swimmers or obstacles in the water near you.

CAUTION:

To change the shifting position from forward to reverse or vice-versa, close the throttle first so that the engine idles (or runs at low speeds).



EMU00264

FORWARD

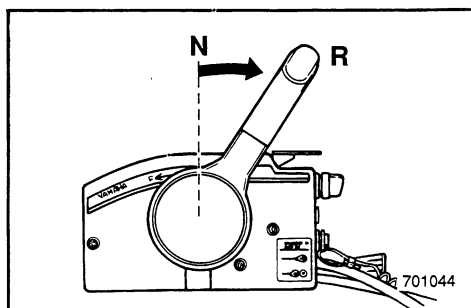
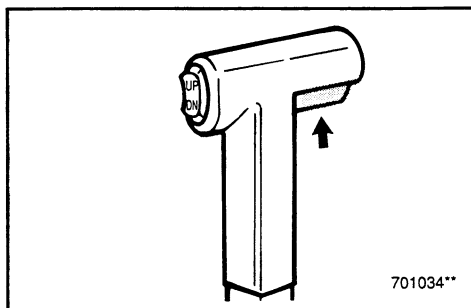
Pull up the neutral interlock trigger (if equipped) and move the remote control lever quickly and firmly from Neutral to Forward.

EMU00269

REVERSE

⚠ WARNING

When operating in Reverse, go slowly. Do not open the throttle more than half. Otherwise, the boat may become unstable, which could result in loss of control and an accident.



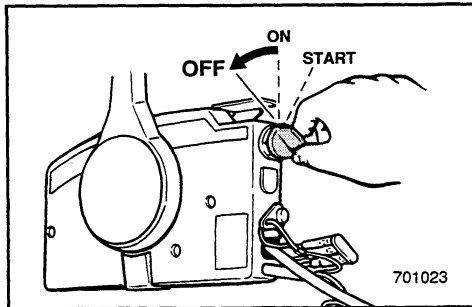
Pull up the neutral interlock trigger (if equipped) and move the remote control lever quickly and firmly from Neutral to Reverse.



EMU00273

STOPPING ENGINE

Let it cool off for a few minutes at idle or low speed first. Stopping the engine immediately after operating at high speed is not recommended.



EMU00276

- 1) Turn the main switch to "OFF".
- 2) If the fuel joints are provided, disconnect the fuel line from the motor after stopping the engine.
- 3) Tighten the air vent screw on the fuel tank cap after stopping the engine, if it is equipped.
- 4) Remove the key if the boat will be left unattended.

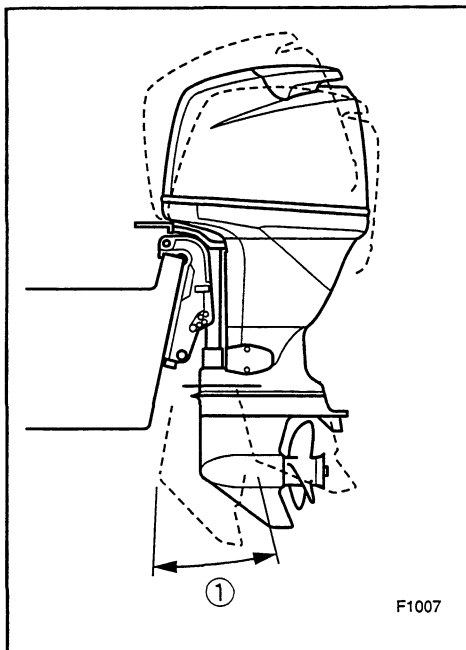
NOTE:

The engine can also be stopped by pulling the lanyard and removing the lock plate from the engine stop lanyard switch (then turning the main switch to "OFF").

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EMU00952

TRIMMING OUTBOARD MOTOR

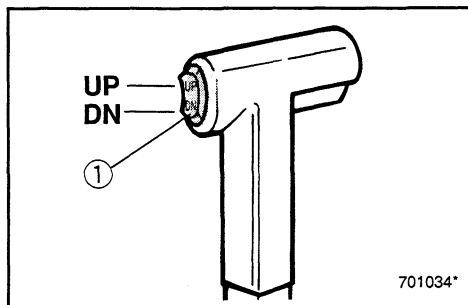


The trim angle of the outboard motor helps determine the position of the bow of the boat in the water. The correct trim angle will help improve performance and fuel economy while reducing strain on the engine. The correct trim angle depends upon the combination of boat, engine, and propeller. Correct trim is also affected by variables such as the load in the boat, sea conditions, and running speed.

⚠ WARNING

Excessive trim for the operating conditions (either trim up or trim down) can cause boat instability and can make steering the boat more difficult. This increases the possibility of an accident. If the boat begins to feel unstable or is hard to steer, slow down and/or readjust the trim angle.

① Trim operating angle

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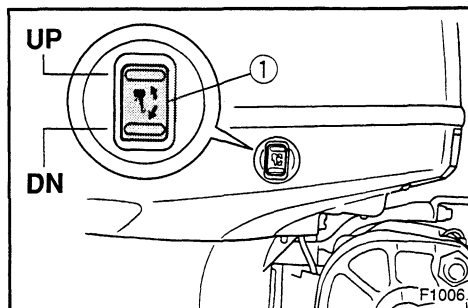
ADJUSTING TRIM ANGLE

EMU00954

Power Trim/Tilt Model

⚠WARNING

Be sure all people are clear of the outboard motor when adjusting the trim/tilt angle, also be careful not to pinch any body parts between the drive unit and clamp bracket.



The outboard motor trim angle can be adjusted operating the power trim/tilt switch ①.

To raise the bow ("trim-out"), push the switch UP.

To lower the bow ("trim-in"), push the switch DN.

Make test runs with the trim set to different angles to find the position that works best for your boat and operating conditions.

⚠WARNING

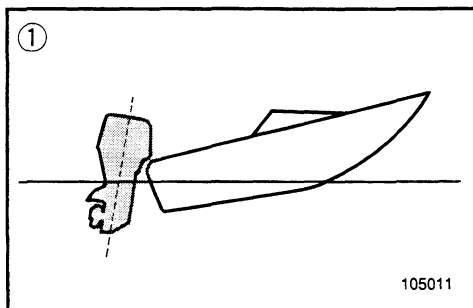
Use caution when trying a trim position for the first time. Increase speed gradually and watch for any signs of instability or control problems. Improper trim angle can cause loss of control.



EMU00282

Bow Up

When the boat is on plane, a bow-up attitude result in less drag, greater stability and efficiency. This is generally when the keel line of the boat is up about 3 to 5 degrees. When trimmed out, the boat may have more tendency to steer to one side or the other. Compensate for this as you steer. The trim tab can also be adjusted to help offset this effect.



Too much trim-out puts the bow of the boat too high in the water. Performance and economy are decreased because the hull of the boat is pushing the water and there is more air drag.

Excessive trim-up can cause the propeller to ventilate, which reduces performance further. When trimmed-out too much, a boat may "porpoise" (hop in the water), which could throw the operator and passengers overboard.

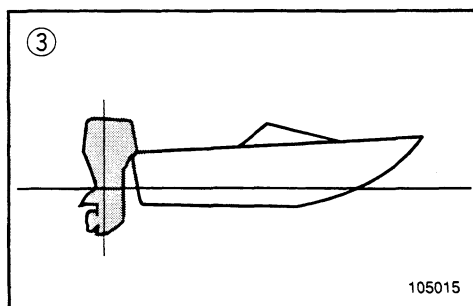
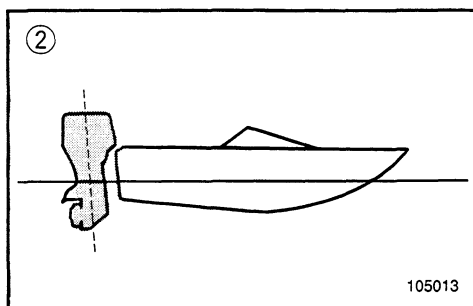
EMU00283

Bow Down

When the bow of the boat is down, it is easier to accelerate from a standing start onto plane.

Too much trim-in causes the boat to "plow" through the water, decreasing fuel economy and making it hard to increase speed.

Operating with excessive trim-in at higher speeds also makes the boat unstable. Resistance at the bow is greatly increased, heightening the danger of "bow steering" and making operation difficult and dangerous.

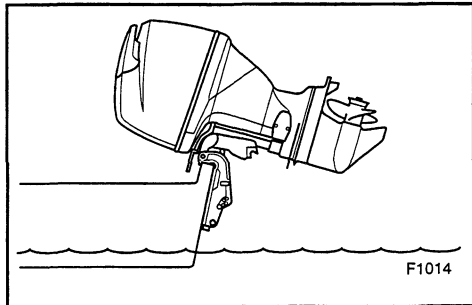


- ① Bow up
- ② Bow down
- ③ Optimum angle

**E**

EMU00285*

TILTING UP/DOWN



If the engine will be stopped for some time, or if the boat is moored in shallows, the engine should be tilted up to protect the propeller and casing from damage by collision with obstructions, and also to reduce salt corrosion.

CAUTION:

Before tilting the motor, follow the procedures under "STOPPING ENGINE". Never tilt the motor while the engine is running. Severe damage from overheating can result.

⚠WARNING

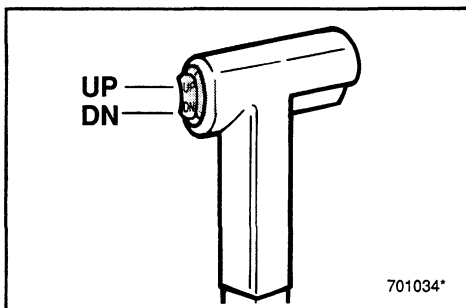
Be sure all people are clear of the outboard motor when adjusting the tilt angle, also be careful not to pinch any body parts between the drive unit and engine bracket.

⚠WARNING

Leaking fuel is a fire hazard. Disconnect the fuel line if the engine will be tilted for more than a few minutes. Otherwise, fuel may leak. (If the fuel connector is provided on the motor.)



E

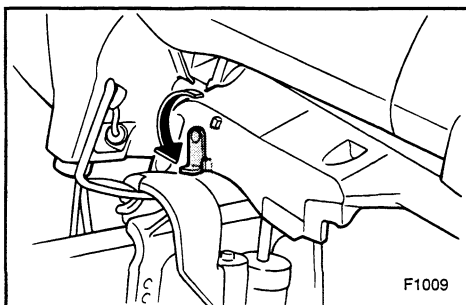
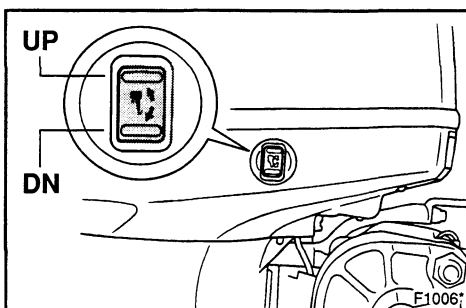


EMU00293*

PROCEDURE FOR TILTING UP

Power trim/tilt model

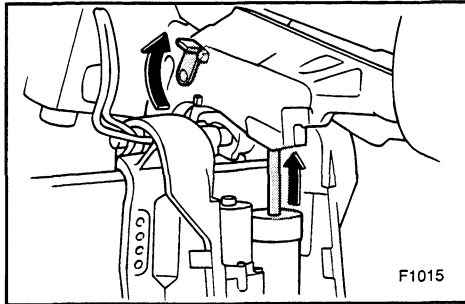
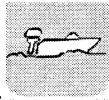
- 1) Remove the fuel-line connection from the motor. (If the fuel connector is provided on the motor.)
- 2) Push the power trim/tilt switch "UP" until the outboard has tilted up completely.



- 3) Turn the tilt-support lever toward engine bracket and support the engine.

⚠ WARNING

- After tilting the engine, be sure to support it with the tilt-support lever. Otherwise, the engine could fall back down suddenly if oil in the power trim/tilt unit should lose pressure.
- Never operate the engine while it is supported by the tilt-support lever.



EMU00303

PROCEDURE FOR TILTING DOWN**Power trim/tilt model**

- 1) Push the power trim/tilt switch "UP" until the engine is supported by the tilt rod.
- 2) Release the tilt-support lever.
- 3) Push the power trim/tilt switch "DN" (Down) to lower the engine to the desired position.

EMU00316*

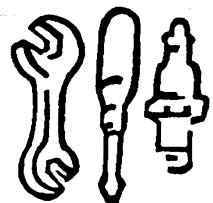
**CRUISING IN OTHER
CONDITIONS****CRUISING IN SALT WATER**

After operating in salt water, wash out the cooling-water passages with fresh water to prevent them from becoming clogged-up with salt deposits.

NOTE: _____

Refer to cooling system flushing instructions in "TRANSPORTING AND STORING OUTBOARD MOTOR".

EMU00317



Chapter 4

MAINTENANCE

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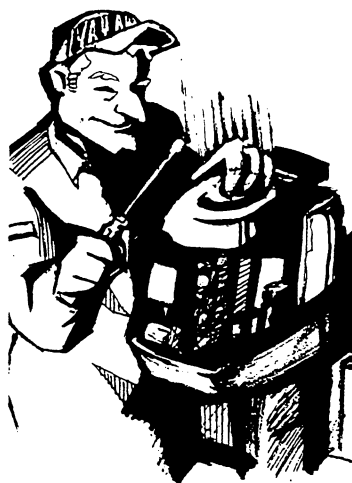
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E

EMU00322

SPECIFICATION DATA

Item	Model	Unit	F100TRX
DIMENSIONS			
● Overall Length		mm (in.)	817 (32.2)
● Overall Width		mm (in.)	479 (18.9)
● Overall Height	L/X	mm (in.)	1,582 (62.3) / 1,710 (67.3)
● Transom height	L/X	mm (in.)	536 (21.1) / 664 (26.1)
● Weight	L/X	kg (lb.)	166 (366) / 169 (373)
PERFORMANCE			
● Full throttle operating range		r/min	5,000 ~ 6,000
● Maximum output		kW (HP) @ r/min	73.6(100.0)@5,500
● Idling speed (Neutral)		r/min	800 ~ 900
ENGINE			
● Type			4-stroke, DOHC, L4
Displacement		cm ³ (cu.in.)	1,596 (97.39)
Bore x stroke		mm (in.)	79.0 x 81.4 (3.11 x 3.20)
● Ignition system			CDI system
● Spark plug		NGK	LFR5A-11
● Spark plug gap		mm (in.)	1.1 (0.043)
● Control system			Remote control
● Starting system			Electric start
Valve clearance (cold engine)	IN	mm (in.)	0.17 ~ 0.23 (0.007 ~ 0.009)
	EX	mm (in.)	0.31 ~ 0.37 (0.012 ~ 0.015)
● Battery capacity		V-AH	12-70 ~ 12-100
Minimum cold crank performance		Amps at -17.8C°(0F)	380
Minimum reserve capacity		Minutes at 26.7C°(80F)	124
● Alternator output		V-A(W)	12-20
● Starting carburation system			Prime start
DRIVE UNIT			
● Gear positions			Forward-Neutral-Reverse
Gear ratio			2.31 (30 / 13)
● Trim/tilt system			Power trim & tilt
● Propeller mark			K
FUEL AND OIL			
● Recommended fuel		P.O.N.	Regular unleaded gasoline
Fuel tank capacity		l(US gal, Imp gal)	(Minimum 86)
● Recommended engine oil		API	4-stroke motor oil
		SAE	SE,SF,SG,SH
● Engine oil capacity (without oil filter)		l(US qt, Imp qt)	10W-30, 10W-40
(with oil filter)		l(US qt, Imp qt)	4.5 (4.8, 4.0)
● Recommended gear oil			4.7 (5.0, 4.1)
Gear oil capacity		cm ³ (US oz, Imp oz)	Hypoid gear oil (SAE90)
			670 (22.64, 23.58)
TIGHTENING TORQUE			
● Spark plug		Nm(m-Kg,ft•lb)	25 (2.5, 18)
● Propeller nut		Nm(m-Kg,ft•lb)	35 (3.5, 25)
● Engine oil drain bolt		Nm(m-Kg,ft•lb)	27 (2.7, 20)
● Engine oil filter		Nm(m-Kg,ft•lb)	18 (1.8, 13)



EMU00325

TRANSPORTING AND STORING OUTBOARD MOTOR

EMU00326

TRAILERING OUTBOARD MOTOR

The motor should be trailered and stored in the normal running position. If there is insufficient road clearance in this position, then trailer the motor in the tilt position using a motor support device such as a transom saver bar.

For further details, consult your Yamaha dealer.

⚠ WARNING

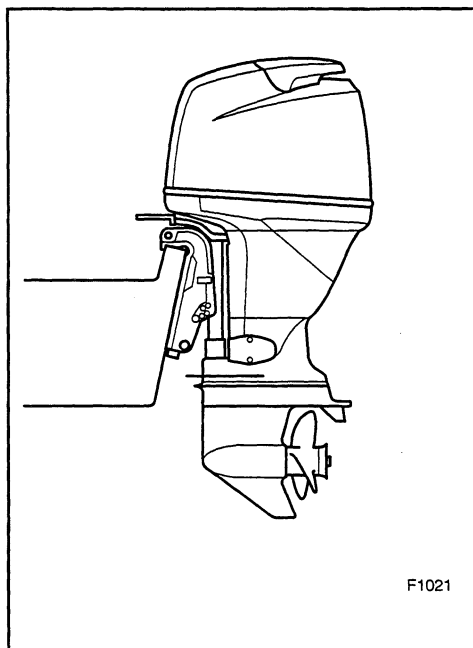
- **Never get under the lower unit while it is tilted, even if a motor support bar is used. Severe injury could occur if the outboard accidentally falls.**

- **USE CARE when transporting fuel tank, whether in a boat or car.**

DO NOT fill fuel container to maximum capacity. Gasoline will expand considerably as it warms up and can build up pressure in the fuel container. This can cause fuel leakage and a potential fire hazard.

CAUTION:

Do not use the tilt support lever/knob when trailering the boat. The outboard motor could shake loose from the tilt support and fall. If the motor can not be trailered in the down position, use an additional support device to secure it in the up position.



F1021

EMU00330*

STORING OUTBOARD MOTOR

When storing your Yamaha outboard for prolonged periods of time, (2 months or longer), several important procedures must be performed to prevent expensive damage.

It is advisable to have your outboard serviced by an authorized Yamaha dealer prior to storage. However, the following procedures can be performed by you, the owner, with a minimum of tools.

CAUTION:

- To prevent problems which can be caused by oil entering the cylinder from the sump, keep the engine in the vertical position when transporting and storing it.

If storing or transporting the outboard motor in a horizontal position, put it on a cushion after draining the engine oil.

- Do not place the engine on its side before the cooling water has drained from it completely, or water may enter the cylinder through the exhaust port and cause problems.
- Store the engine in a dry, well-ventilated place, not in direct sunlight.



EMU00338

Flushing Cooling System and Fogging Engine

Cooling system flushing is essential to prevent the cooling system from clogging up with salt, sand, or dirt. In addition, fogging of the engine is mandatory to prevent expensive engine damage due to rust. Perform the flushing and fogging at the same time.

⚠ WARNING

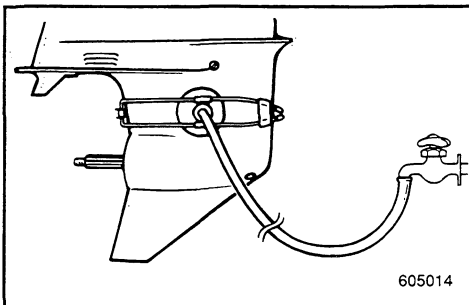
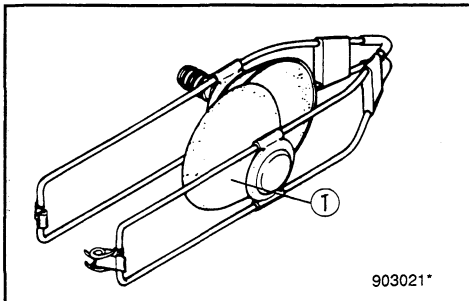
- Do not touch or remove electrical parts when starting or during operation.
- Keep hands, hair and clothes away from flywheel and other rotating parts while engine is running.

EMU00342

Flushing with the Flushing Attachment

CAUTION:

Avoid running the outboard at high speed while on the flushing attachment, or overheating could occur.



- 1) Remove the top cowling and the propeller.
- 2) Install a flushing attachment ① to the cooling water inlet.
- 3) Run the engine at a fast idle for 10~15 minutes supplying fresh water.
- 4) Just prior to turning off the engine, quickly spray "Yamaha Stor-Rite Engine Fogging Oil" (Part No. LUB-STRRT-12-00) alternately into the silencer cover. When properly done, the engine will smoke excessively and almost stall.
- 5) Remove the flushing attachment and wipe off any excess water.
- 6) Install the top cowling and the propeller.

**NOTE:**

A flushing attachment is available from a Yamaha dealer.

EMU00349

Lubrication

- 1) Remove the spark plug(s). Spray a Yamaha "Stor-Rite Engine Fogging Oil" into each cylinder for 10 seconds. Grease the spark plug threads and reinstall the spark plug(s) and torque to proper specification. (Refer to the "CLEANING AND ADJUSTING SPARK PLUG").
- 2) Turn the engine over with the stop lanyard disconnected to work the fogging oil into the piston rings.
- 3) Change the gear-case oil. (Refer to "CHANGING GEAR OIL"). Inspect the oil for the presence of water which indicates a leaky seal. Seal replacement should be performed by an authorized Yamaha dealership prior to use.
- 4) Grease all grease fittings. (Refer to the "GREASING")

EMU00351

Cleaning and Anti-corrosion Measure

- 1) Wash down the exterior of the outboard with fresh water and dry off completely.
- 2) Spray the engine's exterior with "Yamaha Silicone Protectant" (Part No. LUB-SILCNE-13-00).
- 3) Wax the cowling with a non-abrasive wax such as "Yamaha Silicone Wax" (Part No. ACC-11000-15-02).



EMU00353

Battery Care**⚠ WARNING**

Battery electrolyte is poisonous and dangerous, causing severe burns, etc. It contains sulfuric acid. Avoid contact with skin, eyes, or clothing.

Antidote:

EXTERNAL; Flush with water.

INTERNAL; Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

EYES; Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases: Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in a closed space. Always wear eye protection when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

Batteries vary among manufacturers. Therefore the following procedures may not always apply. Consult your battery manufacturer's instructions.

- 1) Disconnect and remove the battery from the boat. Always disconnect the black negative lead first to prevent the risk of shorting.
- 2) Clean the battery casing and terminals. Fill each cell to the upper level with distilled water.
- 3) Store the battery on a level surface in a cool, dry, well-ventilated place out of direct sunlight.
- 4) Once a month, check the specific gravity of the electrolyte and recharge as required to prolong battery life.



EMU00913

PERIODIC MAINTENANCE

⚠ WARNING

Be sure to turn off the engine when you perform maintenance unless otherwise specified. If the owner is not familiar with machine servicing, this work should be done by a Yamaha dealer or other qualified mechanic.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine engine repair establishment or individual. All warranty repairs, however, including those to the emission control system, must be performed by an authorized Yamaha marine dealership.

A service manual is available for purchase through a Yamaha dealer for owners who have the mechanical skills, tools, and other equipment necessary to perform maintenance not covered by this owner's manual.

EMU00356

REPLACEMENT PARTS

If replacement parts are necessary, use only genuine Yamaha parts or equivalents of the same type and of equivalent strength and materials. Any part of inferior quality may malfunction, and the resulting loss of control could endanger the operator and passengers.

Yamaha genuine parts and accessories are available from a Yamaha dealer.



EMU00361

MAINTENANCE CHART

Frequency of maintenance operations may be adjusted according to the operating conditions, but the following table gives general guidelines.

The mark (●) indicates the check-ups which you may carry out yourself.

The mark (○) indicates work to be carried out by your Yamaha dealer.

Interval		Initial		Every		Refer page
		10 hours	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	
Spark plug(s)	Cleaning/Adjustment/ Replacement	●			●	4-10
Greasing points	Greasing			●		4-9
Gear oil	Change	●		●		4-23
Fuel system	Inspection				○	4-12
Fuel filter	Inspection/Replacement	●		●		4-13
Fuel tank*1	Cleaning				●	—
Idling speed	Inspection/Adjustment	●			●	4-14
Anode(s)	Inspection/Replacement				○	4-24
Outboard motor exterior	Inspection			●		4-28
Cooling water passages*2	Flushing			●		4-4
Propeller	Inspection			●		4-21
Timing belt*3	Inspection/Replacement				○	4-17
Battery	Inspection/Charge	●			○	4-25
Ignition timing	Inspection	○			○	—
Bolts/Nuts*4	Retightening	○			○	4-28
Engine oil	Change	●		●		4-15
Oil filter	Change				○	—
Valve clearance*5	Inspection/Adjustment	○ : every 400 hours (2 years)				—
Thermostat	Inspection				○	—

*1. If a portable fuel tank is equipped.

*2. The engine should be flushed with fresh water after operating in salt, turbid or muddy water.

*3. Be sure to replace the timing belt after every 1,000 hours or 5 years (whichever comes first) of operation.

*4. Except for the cylinder head bolts and crankcase journal bolts.

*5. If leaded gasoline is usually used, engine valves and related parts should be inspected after every 300 hours of operation in addition to the items on the maintenance chart above.

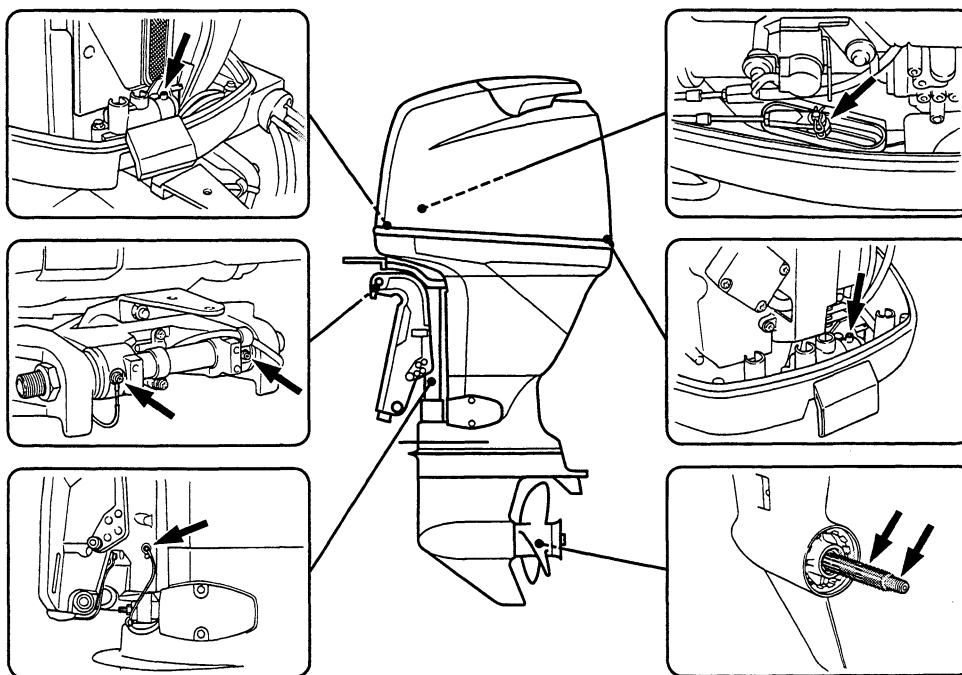


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EMU00366

GREASING

Yamaha marine grease
(Water resistant grease)



F1017



EMU00368*

CLEANING AND ADJUSTING SPARK PLUG

⚠ WARNING

When removing or installing a spark plug, be careful not to damage the insulator. A damaged insulator could allow external sparks, which could lead to explosion or fire.

The spark plug is an important engine component and is easy to inspect. The condition of the spark plug can indicate something about the condition of the engine. For example, if the center electrode porcelain is very white, this could indicate an intake air leak or carburetion problem in that cylinder. Do not attempt to diagnose any problems yourself. Instead, take the outboard motor to a Yamaha dealer. You should periodically remove and inspect the spark plug because heat and deposits will cause the spark plug to slowly break down and erode. If electrode erosion becomes excessive, or if carbon and other deposits are excessive, you should replace the spark plug with another of the correct type.

Standard spark plug:
Refer to "SPECIFICATIONS", page 4-1.

Before fitting the spark plug, measure the electrode gap with a wire thickness gauge; adjust the gap to specification if necessary.

Spark plug gap:
Refer to "SPECIFICATIONS", page 4-1.

**E**

When fitting the plug, always clean the gasket surface and use a new gasket. Wipe off any dirt from the threads and screw in the spark plug to the correct torque.

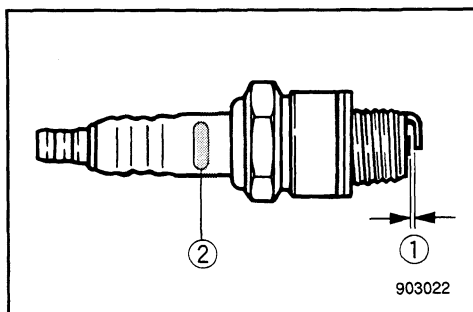
Spark plug torque:

Refer to "SPECIFICATIONS", page 4-1.

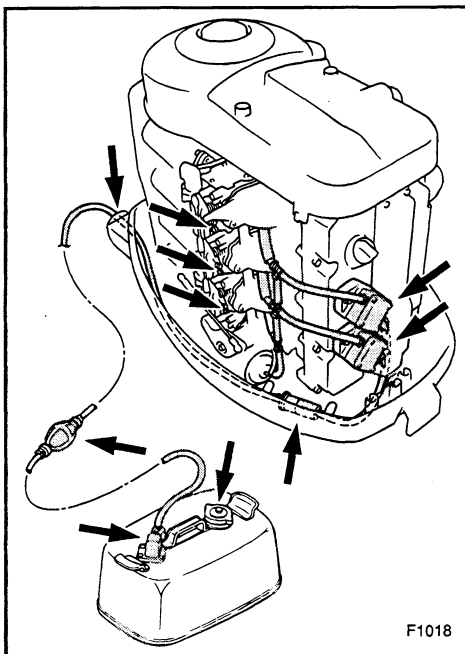
NOTE:

If a torque-wrench is not available when you are fitting a spark plug, a good estimate of the correct torque is 1/4 to 1/2 a turn past finger-tight. Have the spark plug adjusted to the correct torque as soon as possible with a torque-wrench.

Initial of spark plug I.D. mark	Plug wrench size
B	21 mm (13/16 in.)
C, L	16 mm (5/8 in.)
D	18.3 mm (23/32 in.)



- ① Spark plug gap
- ② Spark plug I.D. mark (NGK)

**E**

EMU00369

CHECKING FUEL SYSTEM

⚠ WARNING

Gasoline (petrol) and its vapors are highly flammable and explosive. Keep away from sparks, cigarettes, flames or other sources of ignition.

Check the fuel line for leaks, cracks, or malfunctions. If any problem is found, it should be repaired immediately by Yamaha dealer or other qualified mechanic.

Checking points

- Fuel system parts leakage.
- Fuel hose joint leakage.
- Fuel hose cracks or other damage.
- Fuel connector leakage.

⚠ WARNING

Leaking fuel can result in fire or explosion.

- Check for fuel leakage regularly.
- If any fuel leakage is found, the fuel system must be repaired by a qualified mechanic. Improper repairs can make the outboard unsafe to operate.

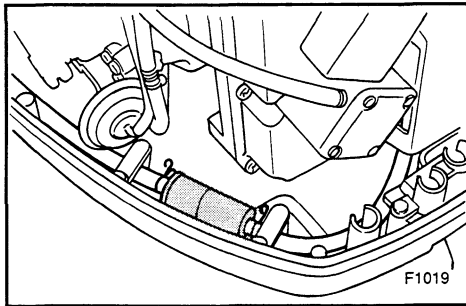


EMU00370

INSPECTING FUEL FILTER**⚠ WARNING**

Gasoline (petrol) is highly flammable, and its vapors are flammable and explosive.

- If you have any question about properly doing this procedure, consult your Yamaha dealer.
- Do not perform this procedure on a hot or running engine. Allow the engine to cool.
- There will be fuel in the fuel filter. Keep away from sparks, cigarettes, flames or other sources of ignition.
- This procedure will allow some fuel to spill. Catch fuel in a rag. Wipe up any spilled fuel immediately.
- The fuel filter must be reassembled carefully with O-ring, filter cup, and hoses in place. Improper assembly or replacement can result in a fuel leak, which could result in a fire or explosion hazard.



EMU00374

Check the fuel filter periodically.

The fuel filter is a one-piece, disposable type. If foreign matter is found in the filter, replace it. For replacement of the fuel filter, consult a Yamaha dealer.

**E**

EMU00991

ADJUSTING IDLING SPEED

⚠ WARNING

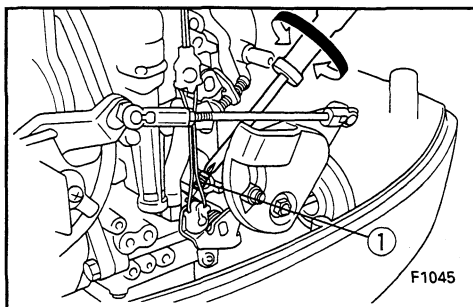
- Do not touch or remove electrical parts when starting or during operation.
- Keep hands, hair and clothes away from flywheel and other rotating parts while engine is running.

CAUTION:

This procedure must be performed while the outboard motor is in the water. A flushing attachment or test tank can be used.

A diagnostic tachometer should be used for this procedure.

- 1) Start the engine and allow it to warm up fully in Neutral until it is running smoothly. If the outboard is mounted on a boat, be sure the boat is tightly moored.
- 2) Adjust the throttle stop-screw ① to set the idling speed to specification (see "SPECIFICATIONS" on page 4-1) by turning the stop-screw clockwise to increase the idling speed, and turning it counterclockwise to decrease the idling speed.



NOTE:

Correct idling-speed adjustment is only possible if the engine is fully warmed-up. If not warmed up fully, the speed setting will tend to be too high. If you have difficulty obtaining the specified idle, consult a Yamaha dealer or other qualified mechanic.



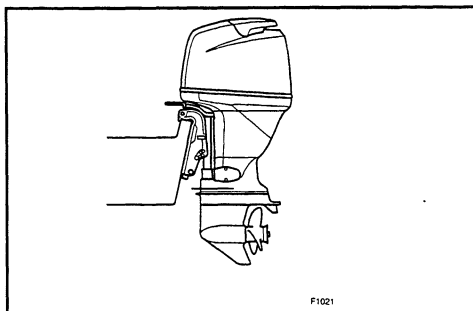
EMU00904

CHANGING ENGINE OIL**⚠ WARNING**

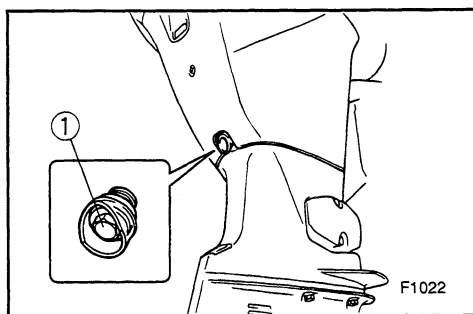
- Avoid draining the engine oil immediately after stopping the engine. The oil is hot and should be handled with care to avoid burns.
- Be sure the outboard is securely fastened to the transom or a stable stand.

CAUTION:

- Change the engine oil after the first 10 hours of operation, and every 100 hours or at 6-month intervals thereafter. Otherwise, the engine will wear quickly.
- Do not overfill the oil. Otherwise, the engine may result a damage. Be sure that the outboard is upright (not tilted) when checking the oil.



- 1) Put the outboard motor in a vertical position (not tilted).
- 2) Prepare a suitable container with more than the engine oil capacity. Loosen and remove the drain bolt ① holding the container under the drain hole. Let the oil drain completely. Wipe up any spilled oil immediately.

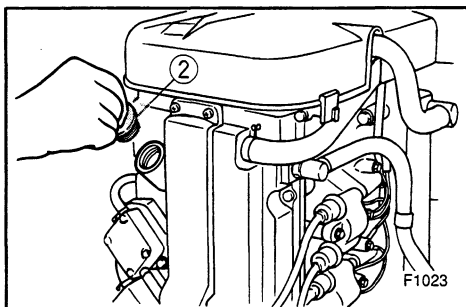


- 3) Put new gasket on the drain bolt. Apply oil lightly the gasket, then reinstall the drain bolt.

Tightening torque:
Refer to SPECIFICATIONS on page 4-1.

**E****NOTE:**

If a torque wrench is not available when you are installing the drain plug, finger tighten the bolt just until the gasket contacts the surface of the drain hole. Then tighten 1/4 - 1/2 turn. Have the drain plug torqued to the correct value with a torque wrench as soon as possible.



- 4) Remove the oil filler cap ②. Add the correct amount of oil through the filler hole.
Reinstall the filler cap.

Engine oil grade/capacity:
Refer to SPECIFICATIONS on page 4-1.

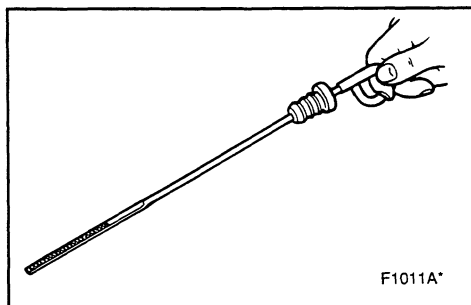
- 5) Start the engine and watch to make sure the Low oil pressure warning lamp turns off. Make sure that there are no oil leaks.

CAUTION:

If the oil lamp does not turn off, or if there are oil leaks, stop the engine and find the cause. Continued operation with a problem could cause severe engine damage. If the problem cannot be found and corrected, consult your Yamaha dealer.



E



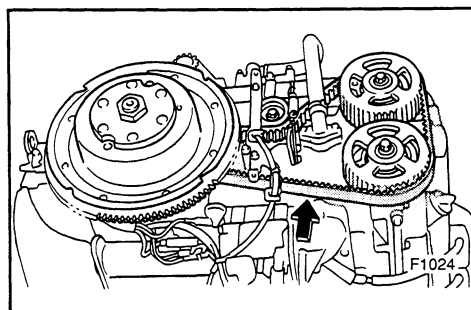
6) Turn off the engine and wait 3 minutes. Recheck oil level by the oil dipstick.

If necessary, add oil to upper level.

7) Dispose of used oil according to local regulations.

NOTE:

- For disposal of used oil consult your Yamaha dealer.
- The oil should be changed more often when the engine is operated under adverse conditions such as extended trolling.



EMU00380*

CHECKING TIMING BELT

Inspect the timing-belt and replace it if any to the following signs is observed:

- Cracks in the back of the belt or in the base of belt teeth.
- Excessive wear at the roots of cogs.
- Rubber portion swollen by oil.
- Belt surfaces roughened.
- Signs of wear on edges or outer surface of belt.
- Stretching by 10 mm (0.39 in) or more when the belt is pushed with a finger.

CAUTION:

Consult your Yamaha dealer for replacing the timing-belt.

**E**

EMU00382

REPLACING FUSE

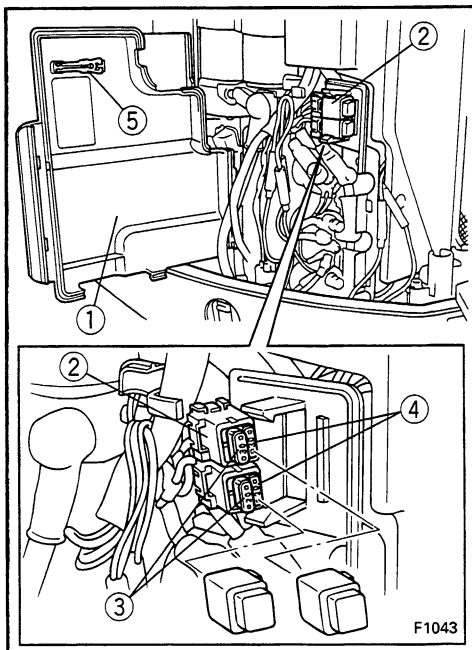
If the fuse(s) has blown, open the electric cover and remove the fuse with a fuse puller. Replace the fuse with a spare one of proper amperage.

⚠ WARNING

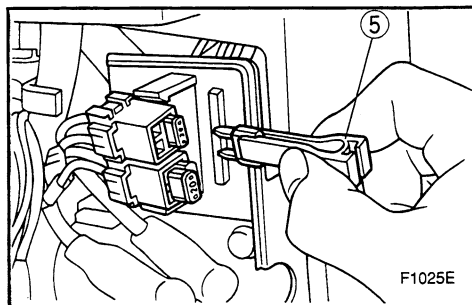
Be sure to use the specified fuse. A wrong fuse or a piece of wire may allow excessive current flow. This could cause electrical system damage and a fire hazard.

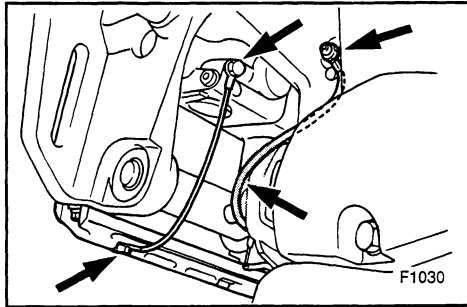
NOTE:

If the new fuse blows again immediately, consult a Yamaha dealer.



- ① Electric cover
- ② Fuse box
- ③ Fuse (30A × 1, 20A × 1)
- ④ Spare fuse (30A, 20A)
- ⑤ Fuse puller





EMU00383

CHECKING WIRING AND CONNECTORS

- 1) Check that each grounding wire is properly secured.
- 2) Check that each connector is engaged securely.

EMU00384

EXHAUST LEAKAGE

Start the engine and check that no exhaust leaks from the joints between the exhaust cover, cylinder head and crank case.

EMU00385

WATER LEAKAGE

Start the engine and check that no water leaks from the joints between the exhaust cover, cylinder head and crank case.



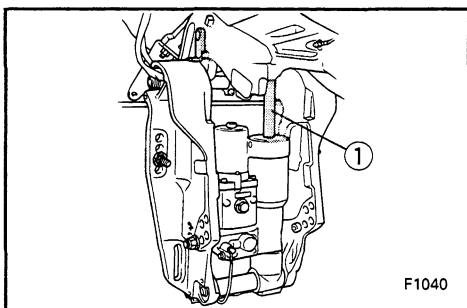
E

EMU00992

CHECKING POWER TRIM AND TILT SYSTEM

⚠WARNING

- Never get under the lower unit while it is tilted, even when the tilt-support lever is locked. Severe injury could occur if the outboard accidentally falls.
- Make sure no one is under the outboard before performing this test.

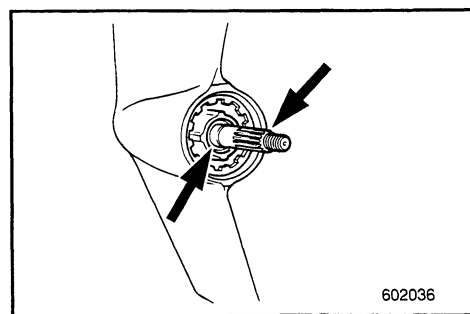
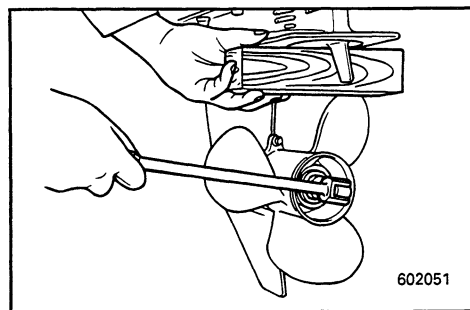
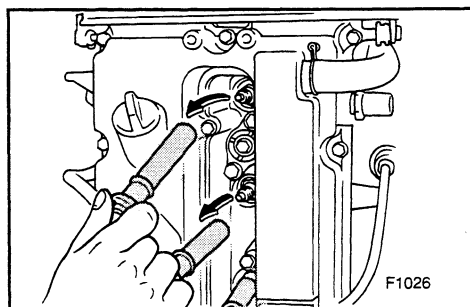
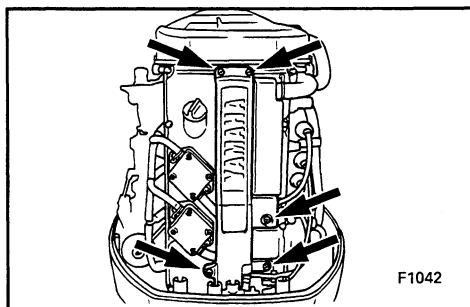


- 1) Check the power trim and tilt unit for any sign of oil leaks.
- 2) Operate each of the power trim and tilt switches on remote control and engine bottom cowling (If equipped) to check that all switches work.
- 3) Tilt up the motor and check that the trim and tilt rod ① is pushed out completely.
- 4) Check that the trim and tilt rod is free of corrosion or other flaws.
- 5) Operate the motor to trim and tilt down. Check that the trim and tilt rod operates smoothly.

NOTE:

If any operation is abnormal, consult a Yamaha dealer.

Recommended fluid;
Yamaha power trim & tilt fluid or
ATF (DEXRON-II)



EMU00388*

CHECKING PROPELLER

- 1) Remove the 5 screws and the cover.
- 2) Remove the spark plug caps from the spark plugs.

⚠WARNING

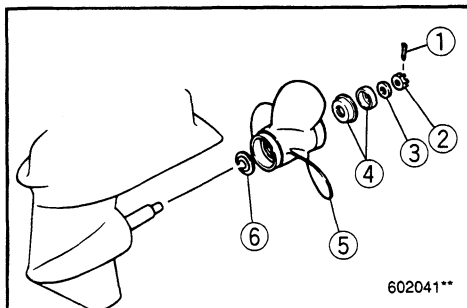
You could be seriously injured if the engine accidentally starts while you are near the propeller.

- Before inspecting, removing or installing the propeller, remove the spark plug caps from the spark plugs. Also, put the shift control in Neutral, put the main switch in the "OFF" position and remove the key, and remove the lanyard from the engine stop switch. Turn off the battery cut-off switch if your boat has one.
- Do not use your hand to hold the propeller when loosening or tightening the propeller nut. Put a wood block between the cavitation plate and the propeller to prevent the propeller from turning.

EMU00390

Propeller Checking Point

- Check each of the propeller blades for wear, erosion from cavitation or ventilation, or other damage.
- Check the splines for wear and damage.
- Check for fish line winding around the propeller shaft.
- Check the propeller shaft oil seal for damage.

**E**

EMU00976

Removing the Propeller

- 1) Straighten the cotter-pin ① and pull it out using a pair of pliers.
- 2) Remove the propeller nut ②, washer ③ and spacer ④.
- 3) Remove the propeller ⑤ and thrust washer ⑥.

EMU00397

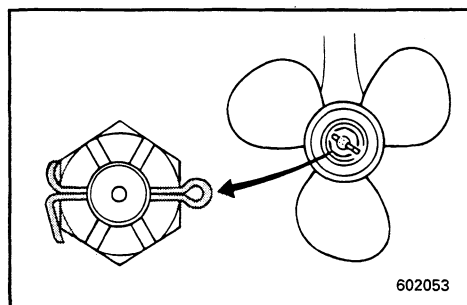
Installing the Propeller**CAUTION:**

- Be sure to install the thrust washer before installing propeller, otherwise, lower case and propeller boss may be damaged.
- Be sure to use a new cotter pin and bend the ends over securely. Otherwise, the propeller could come off during operation and be lost.

- 1) Apply Yamaha Marine grease or Corrosion resistant grease to the propeller-shaft.
- 2) Install the thrust washer and propeller on the propeller-shaft.
- 3) Install the spacer and washer. Tighten the propeller nut to the specified torque.

Tightening torque:

Refer to "SPECIFICATIONS" page 4-1.



- 4) Align the propeller nut with the propeller shaft hole. Insert a new cotter pin in the hole and bend the cotter pin ends.

NOTE:

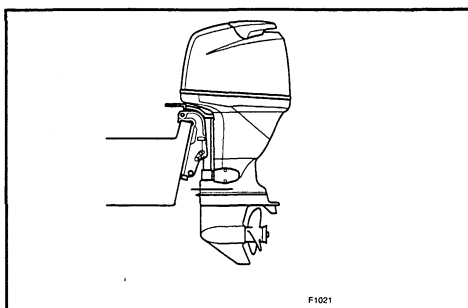
If the propeller nut does not align with the propeller shaft hole after tightening to the specified torque, then tighten the nut further to align it with the hole.



EMU00905

CHANGING GEAR OIL**⚠WARNING**

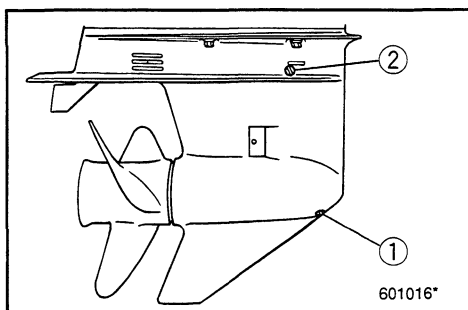
- Be sure the outboard is securely fastened to the transom or a stable stand. You could be severely injured if the outboard falls on you.
- Never get under the lower unit while it is tilted, even when the tilt-support lever is locked. Severe injury could occur if the outboard accidentally falls.



- 1) Put the outboard in a vertical position (not tilted).
- 2) Place a suitable container under the gear-case.
- 3) Remove the oil drain plug ①.

NOTE:

The oil drain plug is magnetic. Remove all metal particles from the plug before re-installing it.



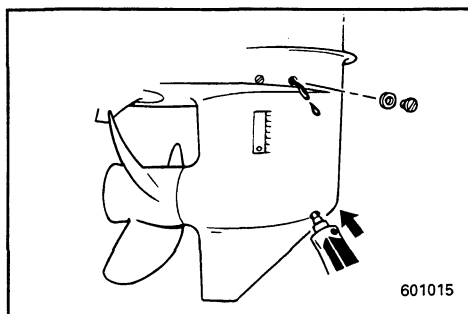
- 4) Remove the oil level plug ② to allow the oil to drain completely.

CAUTION:

Inspect the used oil after it has been drained. If the oil is milky, water is getting into the gear-case which can cause gear damage. Consult a Yamaha dealer for repair of the lower unit seals.

NOTE:

For disposal of used oil consult your Yamaha dealer.



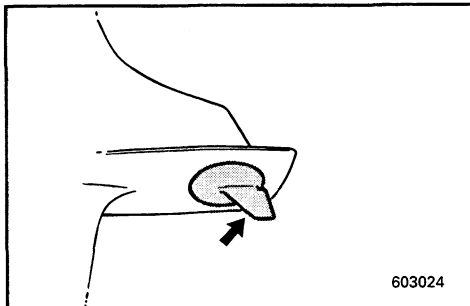
- 5) With the outboard motor in a vertical position, using a flexible or pressurized filling device, inject the gear oil into the oil drain plug hole.



E

Gear oil grade/capacity:
Refer to SPECIFICATIONS on page 4-1.

- 6) When the oil begins to flow out of the oil level plug hole, insert and tighten the oil level plug.
- 7) Insert and tighten the oil drain plug.



EMU00831*

INSPECTING AND REPLACING ANODE(S)

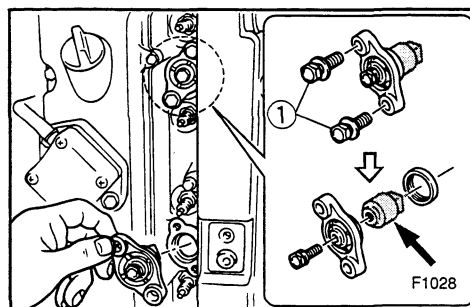
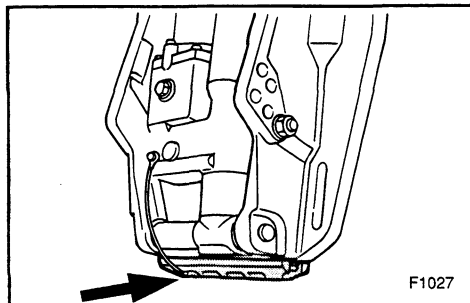
Yamaha outboard motor is protected from corrosion by a sacrificial anode(s). Check the anode(s) periodically. Remove the scales from surfaces of the anode(s). For the inspection and replacement of the anode(s), consult a Yamaha dealer.

CAUTION:

Do not paint the anode(s), for this would render it ineffective

NOTE:

Remove the cover with anode after removing the bolts ① when checking the anode condition.





EMU00404

CHECKING BATTERY (for Electric start model)

⚠ WARNING

Battery electrolytic fluid is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- Avoid bodily contact with electrolytic fluid as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN - Flush with water.
- EYES - Flush with water for 15 minutes and get immediate medical attention.

Antidote (INTERNAL):

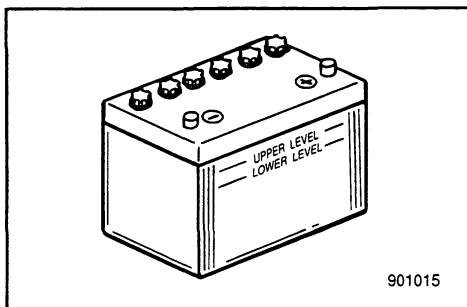
- Drink large quantities of water or milk followed by milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.

Batteries also generate explosive hydrogen gas; therefore, you should always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTIC FLUID OUT OF REACH OF CHILDREN.



E



CAUTION:

- A poorly maintained battery will quickly deteriorate.
- Ordinary tap-water contains minerals harmful to a battery, and should not be used for topping-up.

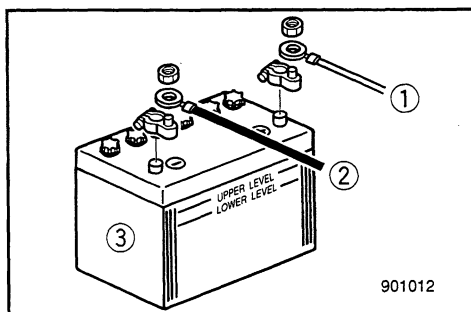
- 1) Check the electrolyte level at least once a month. Fill to the manufacturer's recommended level when necessary. Top up only with distilled water (or pure de-ionized water suitable to use in batteries).
- 2) Keep the battery always in a good state of charge. Installing a voltmeter will help you monitor your battery. If you will not use the boat for a month or more, remove the battery from the boat and store it in a cool, dark place. Completely recharge the battery before using it.
- 3) If the battery will be stored for longer than a month, check the specific gravity of the fluid at least once a month and recharge the battery when it is low.



EMU00405

Connecting the Battery**⚠ WARNING**

Mount the battery holder securely in a dry, well-ventilated, vibration-free location in the boat. Install the fully charged battery in the holder.



Connect the RED lead to the POSITIVE (+) terminal first.

Then connect the BLACK lead to the NEGATIVE (-) terminal.

- ① Red lead
- ② Black lead
- ③ Battery

EMU00407

Disconnecting the Battery

Disconnect the BLACK lead from the NEGATIVE (-) terminal first. Then disconnect the RED lead from the POSITIVE (+) terminal.

CAUTION:

- Make sure the main switch (on applicable models) is "OFF" before working on the battery.
- Reversal of the battery leads will damage the rectifier.
- Connect the RED lead first when installing the battery and disconnect the RED lead last when removing it. Otherwise, the electrical system can be damaged.
- The electrical contacts of the battery and cables must be clean and properly connected, or the battery will not start the engine.



EMU00408*

CHECKING BOLTS AND NUTS

- 1) Check that bolts securing the engine and the nut securing the flywheel are tightened with their specified tightening torque.
- 2) Check the tightening torque of other bolts and nuts.

EMU00409

MOTOR EXTERIOR

EMU00410

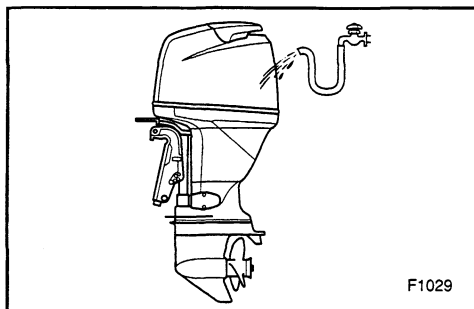
Cleaning the Outboard Motor

After use, wash the exterior of the outboard with fresh water.

Flush the cooling system with fresh water.

NOTE: _____

Refer to Flushing Cooling System instructions in "TRANSPORTING AND STORING OUTBOARD MOTOR".

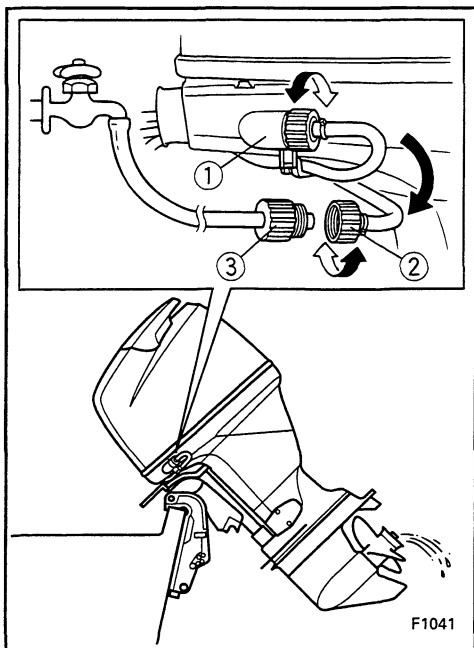


EMU00411

Cleaning Cooling-water Passages Flushing device equipped model

Perform this procedure right after operation for the most thorough flushing.

- 1) After shut off the engine, tilt the engine up. Unscrew the garden-hose connector ② from the fitting ① on the bottom cowling.
- 2) Screw the garden-hose connector ② onto a garden hose ③ which is connected to a fresh-water supply.
- 3) With the engine off, open the water tap and let the water flush through the cooling passages for about 15 minutes. Turn off the water and disconnect the garden hose ③.
- 4) When flushing is complete, reinstall the garden-hose connector ② on the fitting ① on the bottom cowling. Tighten the connector securely.



**CAUTION:**

Do not leave the garden-hose connector loose on the bottom cowling fitting or let the hose hang free during normal operation. Water will leak out of the connector instead of cooling the engine, which can cause serious overheating. Be sure the connector is tightened securely on the fitting after flushing the engine.

NOTE:

Refer to cooling system flushing instructions in "TRANSPORTING AND STORING OUTBOARD MOTOR".

EMU00412

Checking Painted Surface of Motor

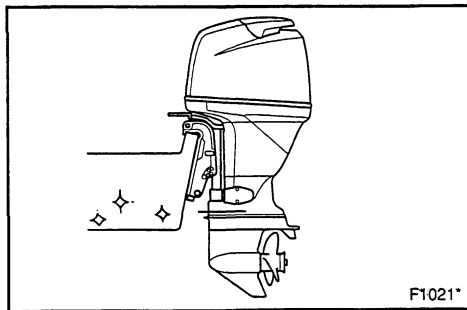
Check the motor for scratches, nicks, or flaking paint. Areas with damaged paint are more likely to corrode. If necessary, clean and paint the areas. A touch-up paint is available from a Yamaha dealer.

EMU00413

COATING THE BOAT BOTTOM

A clean hull improves boat performance. The boat bottom should be kept as clean of marine growths as possible. If necessary, the boat bottom can be coated with an anti-fouling paint approved for your area to inhibit marine growth.

Do not use anti-fouling paint which includes copper or graphite. These paints can cause more rapid engine corrosion.



EMN00010

Chapter 5

TROUBLE RECOVERY

TRoubleshooting5-1

TEMPORARY ACTION IN

EMERGENCY5-5

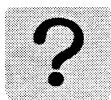
Impact damage5-5

Power trim/tilt will not operate5-5

Starter will not operate5-6

Engine fails to operate5-8

Treatment of submerged motor5-9



EMU00415

TROUBLESHOOTING

Trouble	Possible Cause	Remedy
A. Starter will not operate	<ol style="list-style-type: none">1. Battery capacity weak or low2. Battery connections loose or corroded3. Fuse for electric start circuit blown4. Starter components faulty5. Engine stop switch lanyard not attached6. Shift lever is gear-in position	<ol style="list-style-type: none">1. Check battery condition. Use battery of recommended capacity.2. Tighten battery cables and clean battery terminals.3. Check for cause of electric overload and repair. Replace fuse with one of correct amperage.4. Have Yamaha dealer service.5. Attach lanyard.6. Position to neutral.
B. Engine will not start (Starter operates)	<ol style="list-style-type: none">1. Fuel tank empty2. Fuel contaminated or stale3. Fuel filter clogged4. Starting procedure is wrong5. Fuel pump malfunctions6. Spark plug(s) fouled or wrong type7. Spark plug cap(s) fitted incorrectly8. Poor connections or damaged ignition wiring9. Ignition parts faulty10. Engine stop switch lanyard not attached11. Shift lever is gear-in position12. Engine inner parts damaged	<ol style="list-style-type: none">1. Fill tank with clean, fresh fuel.2. Fill tank with clean, fresh fuel.3. Clean or replace it.4. Read "STARTING ENGINE" section.5. Have Yamaha dealer service.6. Inspect spark plug(s). Clean or replace with recommended type.7. Check and re-fit cap(s).8. Check wires for wear or breaks. Tighten all loose connections. Replace worn or broken wires.9. Have Yamaha dealer service.10. Attach lanyard.11. Position to neutral.12. Have Yamaha dealer service.



Trouble	Possible Cause	Remedy
C. Engine idles irregularly or stalls	<ol style="list-style-type: none">1. Spark plug(s) fouled or wrong type2. Fuel system obstructed3. Fuel contaminated or stale4. Fuel filter clogged5. Failed ignition parts6. Warning system activated7. Spark plug gap incorrect8. Poor connections or damaged ignition wiring9. Fuel filter clogged.10. Specified engine oil not used11. Thermostat faulty or clogged12. Carburetor adjusts incorrect13. Fuel pump damaged14. Air vent screw on the fuel tank is closed15. Choke knob is pulled out16. Motor angle is too high17. Carburetor is clogged18. Throttle valve adjusts incorrect19. Battery lead is removed	<ol style="list-style-type: none">1. Inspect spark plug(s). Clean or replace with recommended type.2. Check for pinched or kinked fuel line or other obstructions in fuel system.3. Fill tank with clean, fresh fuel.4. Clean or replace filter.5. Have Yamaha dealer service.6. Find and correct cause.7. Inspect and adjust as specified.8. Check wires for wear or breaks. Tighten all loose connections.9. Clean or replace filter.10. Check and replace it as specified.11. Have Yamaha dealer service.12. Have Yamaha dealer service.13. Have Yamaha dealer service.14. Open the air vent screw.15. Return to home position.16. Return to normal operating position.17. Have Yamaha dealer service.18. Have Yamaha dealer service.19. Connect securely.



Trouble	Possible Cause	Remedy
D. Warning buzzer sounds or indicator lamp lights	<ol style="list-style-type: none">1. Cooling system clogged2. Engine oil level low3. Heat range of spark plug incorrect4. Specified engine oil not used5. Engine oil contaminated or deteriorated6. Oil filter clogged7. Oil feed/injection pump malfunctions8. Load on boat improperly distributed9. Water pump/thermostat faulty	<ol style="list-style-type: none">1. Check water intake for restriction.2. Fill oil tank with specified engine oil.3. Check the plug condition and replace it with a correct one.4. Check and replace specified one.5. Replace it with fresh, specified one.6. Have Yamaha dealer service.7. Have Yamaha dealer service.8. Distribute load to place boat on an even plane.9. Have Yamaha dealer service.
E. Engine power loss	<ol style="list-style-type: none">1. Propeller damaged2. Propeller pitch or diameter wrong3. Trim angle incorrect4. Motor mounted at wrong height on transom5. Warning system activated6. Boat bottom fouled with marine growth7. Spark plug(s) fouled or wrong type8. Weeds or other foreign matter tangled on gear housing9. Fuel system obstructed10. Fuel filter clogged11. Fuel contaminated or stale12. Spark plug gap incorrect	<ol style="list-style-type: none">1. Have propeller repaired or replaced.2. Install correct propeller to operate outboard at its recommended rpm range.3. Adjust trim angle to gain most efficient operation.4. Have motor adjusted to proper transom height.5. Find and correct cause.6. Clean boat bottom.7. Inspect spark plug(s). Clean or replace with recommended type.8. Remove them and clean lower unit.9. Check for pinched or kinked fuel line or other obstructions in fuel system.10. Clean or replace filter.11. Fill tank with clean, fresh fuel.12. Inspect and adjust as specified.



Trouble	Possible Cause	Remedy
E. Engine power loss	13. Poor connections or damaged ignition wiring	13. Check wires for wear or breaks. Tighten all loose connections Replace worn or broken wires.
	14. Failed ignition parts	14. Have Yamaha dealer service.
	15. Specified engine oil not used	15. Check and replace it as specified.
	16. Thermostat faulty or clogged	16. Have Yamaha dealer service.
	17. Air vent screw is closed	17. Open the air vent screw.
	18. Fuel pump damaged	18. Have Yamaha dealer service.
	19. Fuel joint connection is wrong	19. Connect correctly.
F. Engine vibrates excessively	20. Heat range of spark plug incorrect	20. Check the plug condition and replace it with a correct one.
	1. Propeller damaged	1. Have propeller repaired or replace.
	2. Propeller shaft damaged	2. Have Yamaha dealer service.
	3. Weeds or other foreign matter tangled on propeller	3. Remove and clean propeller.
	4. Motor mounting bolt is loose	4. Tighten the bolt.
	5. Steering pivot is loose or damaged	5. Tighten or have Yamaha dealer service.

EMU00416

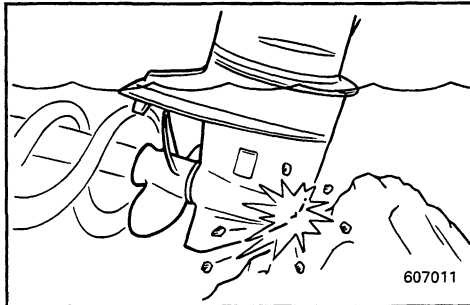
TEMPORARY ACTION IN EMERGENCY

EMU00417

IMPACT DAMAGE

⚠ WARNING

The outboard motor can be seriously damaged by a collision while operating or trailering. Damage could make the outboard motor unsafe to operate.



If the outboard motor hits any object in the water, follow the procedure below.

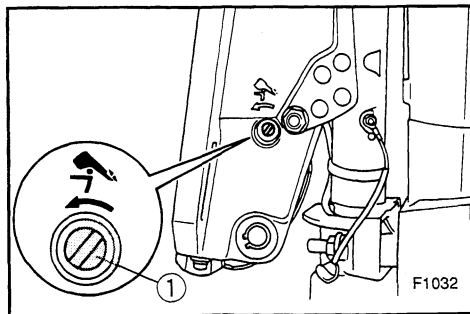
- 1) Stop the engine immediately.
- 2) Inspect control system and all components for damage. Also, inspect the boat damage.
- 3) However damage is found or not found, go back to a nearest harbor slowly and carefully.
- 4) Have a Yamaha dealer inspection of the outboard motor, before operating it again.

EMU00419

POWER TRIM/TILT WILL NOT OPERATE

If the engine cannot be tilted up or down with the power trim and tilt because of a discharged battery or a failure with the power trim and tilt unit, the engine can be tilted manually.

- ① Manual valve screw



EMU00421

- 1) Loosen the manual valve screw counterclockwise until it stops.
- 2) Put the engine in the desired position, then tighten the manual valve screw clockwise.



EMU00423

STARTER WILL NOT OPERATE

If the starter mechanism does not operate (engine cannot be cranked with the starter), the engine can be started with an emergency starter rope.

⚠WARNING

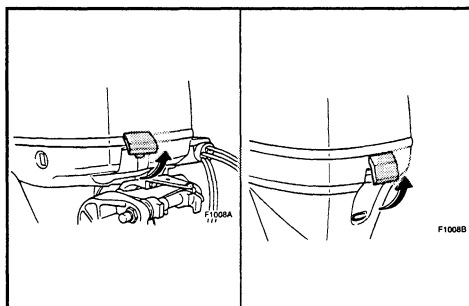
- Use this procedure only in an emergency and only to return to port for repairs.
- When the emergency starter rope is used to start the engine, the start-in-gear protection device does not operate. Make sure the gear shift lever/remote control lever is in neutral. Otherwise, the boat could unexpectedly start to move, which could result in an accident.
- Be sure no one is standing behind you when pulling the starter rope. It could whip behind you and injure someone.
- An unguarded rotating flywheel is very dangerous. Keep loose clothing and other objects away when starting the engine. Use the emergency starter rope only as instructed. Do not touch the flywheel or other moving parts when the engine is running. Do not install the starter mechanism or top cowling after the engine is running.
- Do not touch the ignition coil, high voltage wire, spark plug cap or other electrical components when starting of operating the motor. You could be shocked.



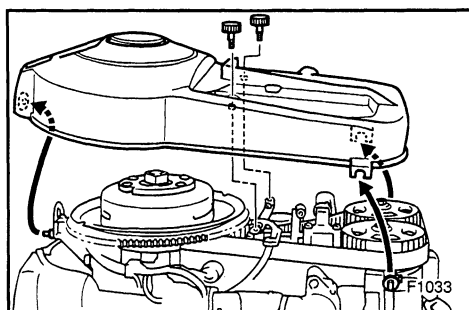
EMU00429*

Emergency Starting Engine

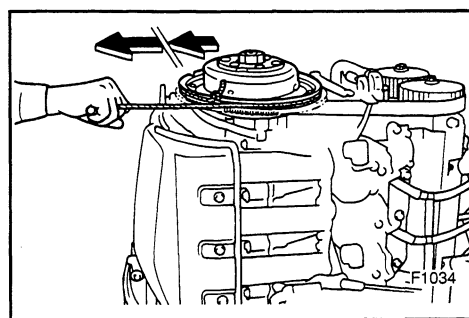
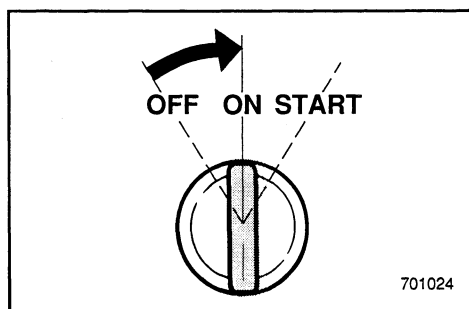
- 1) Remove the top cowling.

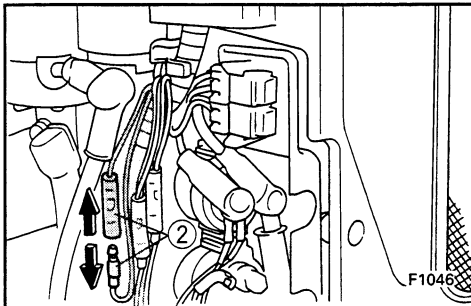
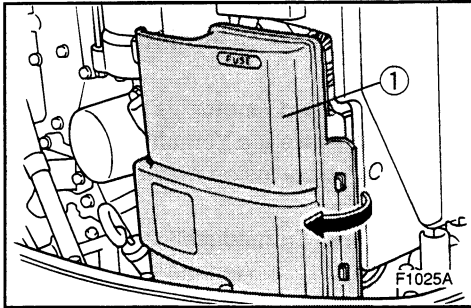


- 2) Remove the two bolts holding the flywheel cover.
- 3) Lift up the rear of flywheel cover and pull it out forward.



- 4) Prepare the engine for starting. See "STARTING ENGINE" for procedures. Be sure the engine is in Neutral and that the lock plate is attached to the engine stop lanyard switch. The main switch must be "ON".
- 5) Insert the knotted end of the emergency starter rope into the notch in the flywheel rotor and wind the rope clockwise.
- 6) Pull the rope slowly until resistance is felt.
- 7) Remove the rope from the flywheel temporarily.
- 8) Rewind the rope approximately 3/4 of a turn clockwise.
- 9) Give a strong pull straight out to crank and start the engine. Repeat if necessary.



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EMU00435*

ENGINE FAILS TO OPERATE

In the unlikely event of an ignition control system malfunction, the engine speed may become erratic or the engine may stop.

In such a case, follow the procedure below.

- 1) Remove the electric cover ①.
- 2) Disconnect the connection of the yellow cord ② (emergency circuit) to return to the nearest port.

⚠ WARNING

When the connection is disconnected, the idling and low speeds are slightly higher than normal. Use care when starting off or stopping.

CAUTION:

Follow this procedure only in an emergency and just long enough to return to port for repairs.



EMU00446

TREATMENT OF SUBMERGED MOTOR

If the outboard motor is submerged, immediately take it to a Yamaha dealer. Otherwise, some corrosion may begin almost immediately.

If you cannot immediately take the outboard motor to a Yamaha dealer, follow the procedure below for taking care to minimize engine damage.

EMU00448

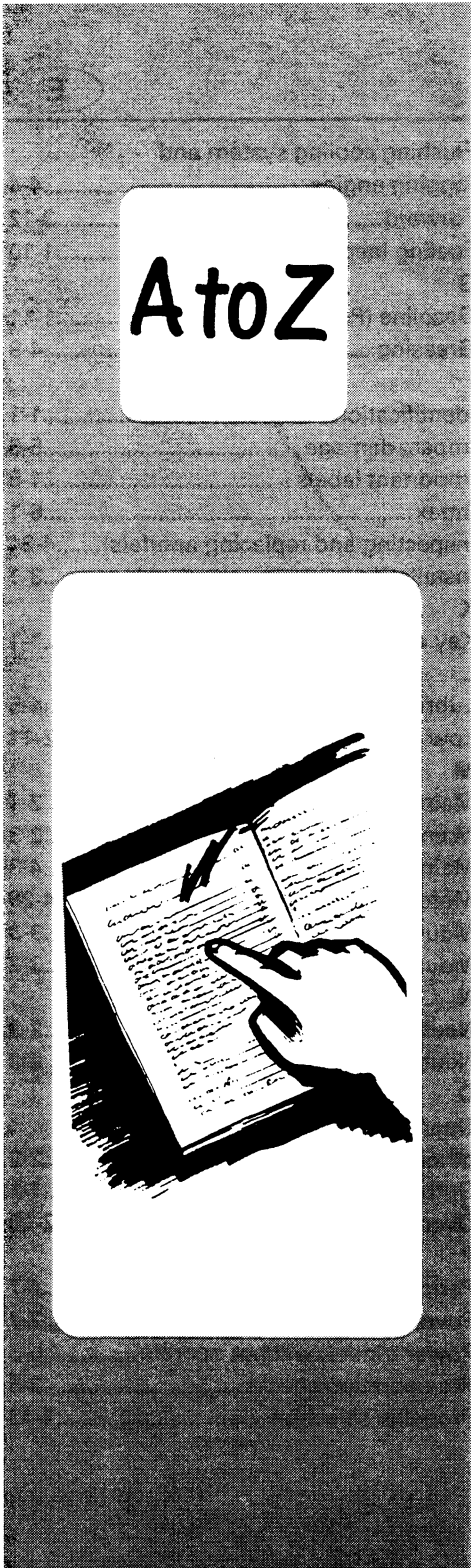
- 1) Thoroughly wash away mud, salt, seaweed, etc. with fresh water.
- 2) Remove the spark plug(s), then face the spark plug holes downward to allow any water, mud or contaminants to drain.
- 3) Drain the fuel from the carburetor, fuel filter and fuel line. Drain the engine oil completely.
- 4) Fill the sump with the fresh engine oil as the same quantity as the engine oil capacity.

Engine oil capacity:
Refer to SPECIFICATIONS, Page 4-1.

- 5) Feed engine fogging oil or engine oil through the carburetor(s) and spark plug hole(s) while cranking the engine with the manual starter or emergency starter rope.
- 6) Take the outboard motor to a Yamaha dealer as soon as possible.

CAUTION:

Do not attempt to run the motor until it has been completely inspected.



EMU00450

Chapter 6
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EMU00451

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IMPORTANT WARRANTY INFORMATION FOR U.S.A. AND CANADA

Welcome to the Yamaha Family!

Congratulations on the purchase of your new Yamaha marine power. Yamaha is committed to exceptional customer satisfaction, and we want your ownership experience to be a satisfying one. Please read the following warranty information to help ensure satisfaction with your Yamaha.

Yamaha is ready to stand behind your purchase with strong warranty coverage. To be sure you receive all the benefits of warranty, please take the following steps:

1. Be sure your new Yamaha is registered for warranty. Your boat dealer should do this at the time of sale. Make sure your dealer gives you a copy of the completed Yamaha registration card for your records. If you are unsure whether or not your Yamaha is registered, complete the Warranty Registration card found inside the cover of the Owner's Manual. Mail it to the distributor for the country in which you live (see step 6 for the correct address). If your Yamaha is not properly registered, a warranty repair could be unnecessarily delayed while registration records are checked.
2. Read the Limited Warranty statement which follows these instructions. This warranty applies to Yamaha outboard motors sold in the United States, whether purchased separately or when supplied as original equipment by a boat builder. The terms also apply to original equipment packages sold in Canada, with coverage provided by Yamaha Motor Canada (see "Warranty Guide" for Canadian models). This warranty explains the conditions of the warranty, including the obligations that your dealer and you as the owner have under the warranty. For example, your Yamaha outboard must receive a proper predelivery inspection (PDI) by the selling dealer. Failure to take this important step could jeopardize warranty coverage!
3. If you need warranty repairs, you must take your Yamaha outboard to an authorized Yamaha outboard dealer. Be aware that not all selling boat dealers are authorized Yamaha dealers. Only authorized dealers have the factory training, special tools, and Yamaha support needed to perform warranty repairs.
4. If you are away from home, or your selling dealer is not an authorized Yamaha dealer, use the following toll-free numbers to find the nearest Yamaha dealer.

United States Dealer Locations: 1-800-447-4700
Canada Dealer Locations: 1-800-267-8577

5. Your warranty applies specifically to repairs made in the country of purchase. If your U.S.-purchased Yamaha needs warranty service while in Canada, or your Canadian purchased Yamaha needs service while in the United States, Yamaha will assist the local dealer whenever possible. However, some products available in one country may not be sold or serviced in the other.
6. If you need any additional information about your Yamaha or warranty coverage which your dealer cannot provide, please contact us directly.

Yamaha Motor Corporation, U.S.A.
P.O. Box 6555
Cypress, CA 90630
Attention: Customer Relations Department

Telephone No. (714) 761-7439
Fax No. (714) 761-7559

Yamaha Motor Canada Ltd.
480 Gordon Baker Road
North York, Ontario
M2H 3B4
Attention: Customer Relations Department

Telephone No. (416) 498-1911
Fax No. (416) 491-3122

YAMAHA MOTOR CORPORATION, U.S.A.

OUTBOARD MOTOR TWO YEAR LIMITED WARRANTY

Yamaha Motor Corporation, U.S.A. is proud of its heritage and reputation for producing products with high standards of quality and workmanship. Product excellence provides the cornerstone for our commitment to customer satisfaction. The Yamaha Outboard Limited Warranty is your assurance of this commitment.

This warranty provides you with protection against the expense of repairs for your outboard motor that are required as a result of defects in materials or workmanship. When maintained and utilized in the prescribed manner, you can count on your Yamaha outboard to provide reliable service.

This warranty provides you with specific coverage and notes your responsibilities in maintaining and operating your outboard. Please take the time to read and become familiar with this warranty.

PERIOD OF WARRANTY. Any new Yamaha outboard motor purchased and registered with Yamaha Motor Corporation, U.S.A. for pleasure use in the United States, will be warranted against defects in material or workmanship for a period of two (2) years from date of purchase, subject to exclusions noted herein. Any Yamaha outboard motor purchased and utilized for commercial applications will be warranted for a period of one (1) year from the date of purchase, subject to exclusions noted herein. Yamaha peripheral equipment included with the motor, such as gauges, fuel tanks and hoses, remote control boxes, propellers, and wiring external from the motor unit, will be warranted for one (1) year from the date of purchase for either pleasure or commercial use. Replacement parts used in warranty repairs will be warranted for the balance of the applicable warranty period.

The second year of warranty (if applicable) shall be limited to covering the cost of parts and labor for major components only. The major components covered are:

Power Unit Section

- Power Head
- Intake Manifold and Reed Valve Assembly
- Carburetor Assembly and its Related Components
- Fuel and Oil Pump Assemblies
- Ignition System (Standard and Microcomputer)
- Precision Blend® System

Bracket Section

- Bracket System
- Power Trim and Tilt Assembly

Lower Unit Section

- Exhaust System
- Upper Casing
- Lower Unit Assembly

The warranty described here applies to outboard motor purchased and registered for use in the United States only excluding its territories. For warranty provisions outside the United States, contact the particular country's local Yamaha distributor.

WARRANTY REGISTRATION. To be eligible for warranty coverage, the outboard motor must first be registered with Yamaha Motor Corporation, U.S.A. A warranty registration form is provided in the Owner's Manual with each outboard. This form must be completed and mailed to Yamaha by either the selling dealer or the purchaser. Warranty registration can also be accomplished by any authorized Yamaha outboard dealer. Upon receipt of the registration, an Owner's Warranty Card will be sent by Yamaha to the registered purchaser.

OBTAINING REPAIRS UNDER WARRANTY. To receive repairs under this warranty, a valid Owner's Warranty Card must be presented to an authorized Yamaha outboard dealer.

During the period of warranty, any authorized Yamaha outboard dealer will, free of charge, repair or replace, at Yamaha's option, any parts adjudged defective by Yamaha due to faulty workmanship or material from the factory. All replaced parts will become the property of Yamaha Motor Corporation, U.S.A.

CUSTOMER'S RESPONSIBILITY. Under the terms of this warranty, the customer will be responsible for ensuring that the outboard motor is properly operated, maintained and stored as specified in the applicable Owner's Manual.

The owner of the outboard motor shall give notice to an authorized Yamaha marine dealer of any and all apparent defects within ten (10) days of discovery and make the motor available at that time for inspection and repairs at the dealer's place of business.

GENERAL EXCLUSIONS FROM WARRANTY. This warranty will not cover the repair of damage if the damage is a result of abuse or neglect of the product. Examples of abuse and neglect include, but are not limited to:

1. Racing or competition use, modification of original parts, abnormal strain.
2. Lack of proper maintenance and off-season storage as described in the Owner's Manual, improper mounting of the motor, installation of parts or accessories that are not equivalent in design and quality to genuine Yamaha parts.
3. Operation of the motor at an rpm other than specified, improper propeller selection, use of lubricants, oils, and fuel/oil mixtures that are not suitable for outboard motor use.
4. Damage as a result of accidents, collisions, contact with foreign materials, or submersion.
5. Growth of marine organisms on motor surfaces.
6. Normal deterioration.

SPECIFIC PARTS EXCLUDED FROM WARRANTY. Parts replaced due to normal wear or routine maintenance such as oil, spark plugs, shear pins, propellers, hubs, fuel and oil filters, brushes for the starter motor and power tilt motor, water pump impellers, and anodes are not covered by warranty. Charges for removal of the motor from a boat and transporting the motor to and from an authorized Yamaha outboard dealer are excluded from warranty coverage.

Specific parts excluded from the second year of warranty (if applicable) are:

- Top and Bottom Cowling
- Electric Components (other than ignition system)
- Rubber Components (such as hoses, tubes, rubber seals, fittings, and clamps)

TRANSFER OF WARRANTY. Transfer of the warranty from the original purchaser to any subsequent purchaser is possible by having the motor inspected by an authorized Yamaha outboard dealer and requesting the dealer to submit a change of registration to Yamaha Motor Corporation, U.S.A. within ten (10) days of the transfer.

EMISSION CONTROL SYSTEM WARRANTY. Yamaha warrants to the ultimate purchaser and each subsequent purchaser, that this engine is designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 213 of the Clean Air Act and this engine is free from defects in materials and workmanship which cause said engine to fail to conform with applicable regulations for one (1) year from date of purchase.

YAMAHA MOTOR CORPORATION, U.S.A. MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE OBLIGATIONS AND TIME LIMITS STATED IN THIS WARRANTY ARE HEREBY DISCLAIMED BY YAMAHA MOTOR CORPORATION, U.S.A. AND EXCLUDED FROM THIS WARRANTY.

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. ALSO EXCLUDED FROM THIS WARRANTY ARE ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING LOSS OF USE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

YAMAHA MOTOR CORPORATION, U.S.A.
Post Office Box 6555
Cypress, California 90630

WARRANTY QUESTIONS AND ANSWERS

- Q. What costs are my responsibility during the warranty period?
- A. The customer's responsibility includes all costs of normal maintenance services, non-warranty repairs, accident and collision damages.
- Q. What are some examples of "abnormal" strain, neglect, or abuse?
- A. These terms are general and overlap each other in areas. Specific examples include:
- Running the machine out of oil, operating the machine with a broken or damaged part which causes another part to fail, damage or failure due to improper or careless transportation, and/or tie down. If you have any specific questions on operation or maintenance, please contact your Yamaha outboard dealer for advice.
- Q. Does the warranty cover incidental costs such as towing or transportation due to a failure?
- A. No. The warranty is limited to repair of the machine itself.
- Q. May I perform any or all of the recommended maintenance shown in the Owner's Manual instead of having the dealer do them?
- A. Yes, if you are a qualified mechanic and follow the procedures specified in the Owner's and Service Manuals. We do recommend, however, that items requiring special tools or equipment be done by a Yamaha outboard dealer.
- Q. Will the warranty be void or canceled if I do not operate or maintain my new outboard exactly as specified in the Owner's Manual?
- A. No. The warranty on a new outboard cannot be "voided" or "cancelled". However, if a particular failure is caused by operation or maintenance other than as shown in the Owner's Manual, that failure may not be covered under warranty.
- Q. What responsibility does a Yamaha outboard dealer have under this warranty?
- A. Each Yamaha outboard dealer is expected to:
1. Completely set up each outboard he sells prior to delivery.
 2. Explain the operation, maintenance, and warranty requirements to your satisfaction at the time of sale, and upon your request at any later date.
- In addition, each Yamaha outboard dealer is held responsible for his setup, service and warranty repair work.
- Q. Is the warranty transferable to second owners?
- A. Yes. The remainder of any existing warranty can be transferred upon request. The unit has to be inspected and re-registered by an authorized Yamaha outboard dealer for the policy to remain effective.

CUSTOMER SERVICE

If your machine requires warranty service, you must take it to any authorized Yamaha outboard dealer within the continental United States. Be sure to bring your warranty registration identification or other valid proof of the original date of purchase. If a question or problem arises regarding warranty, first contact the owner of the dealership. Since all warranty matters are handled at the dealer level, this person is in the best position to help you. If you are still not satisfied and require additional assistance, please write:

YAMAHA MOTOR CORPORATION U.S.A.
CUSTOMER RELATIONS DEPARTMENT
P.O.Box 6555
Cypress, California 90630

When contacting Yamaha Motor Corporation, U.S.A. don't forget to include any important information such as names, addresses, model, engine serial number, dates, and receipts.

CHANGE OF ADDRESS

The federal government requires each manufacturer of a motor vehicle to maintain a complete, up-to-date list of all first purchasers against the possibility of a safety-related defect and recall. This list is compiled from the purchase registrations sent to Yamaha Motor Corporation, U.S.A. by the selling dealer at the time of your purchase.

If you should move after you have purchased your new outboard, please advise us of your new address by sending a postcard listing your outboard model name, engine serial number, dealer number (or dealer's name) as it is shown on your warranty identification, your name and new mailing address. Mail to:

YAMAHA MOTOR CORPORATION, U.S.A.
WARRANTY DEPARTMENT
P.O.Box 6555
Cypress, California 90630

This will ensure that Yamaha Motor Corporation, U.S.A. has an up-to-date registration record in accordance with federal law.

IMPORTANT WARRANTY INFORMATION IF YOU USE YOUR YAMAHA OUTSIDE U.S.A. OR CANADA

Welcome to the Yamaha Family!

Congratulations on the purchase of your new Yamaha marine power. Yamaha is committed to exceptional customer satisfaction, and we want your ownership experience to be a satisfying one. Please read the following warranty information to help ensure satisfaction with your Yamaha.

This model was manufactured as a U.S.A. specification model, and the warranty statement shown in this manual is for market. To receive the benefits of the warranty that applies to the country in which you use your Yamaha, please note the following information.

1. The warranty on this model is the same as equivalent models sold in the country where you will receive service. If you need more information about your warranty coverage or your Yamaha outside the U.S.A. or Canada, please contact an authorized Yamaha dealer in your country.
2. Keep a copy of your sales contract or invoice for the purchase of your Yamaha and present it if you need warranty repairs. This document should show the date of purchase, which is important evidence the repairing dealer will need to be sure your Yamaha is covered by warranty.
3. If your Yamaha needs warranty repairs, contact an authorized Yamaha dealer in the country where you are. He will explain how to get warranty service in that country.
4. This Yamaha model may not be sold in some countries. Therefore, in some cases your local dealer may not have all the parts or service information he may need, which may unavoidably delay repairs. If this happens, we thank you for your understanding and assure you we will attempt to resolve the situation as quickly as possible.

